

Workbench

January
February
1959

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MOSAICS . . .
an ancient art
revived



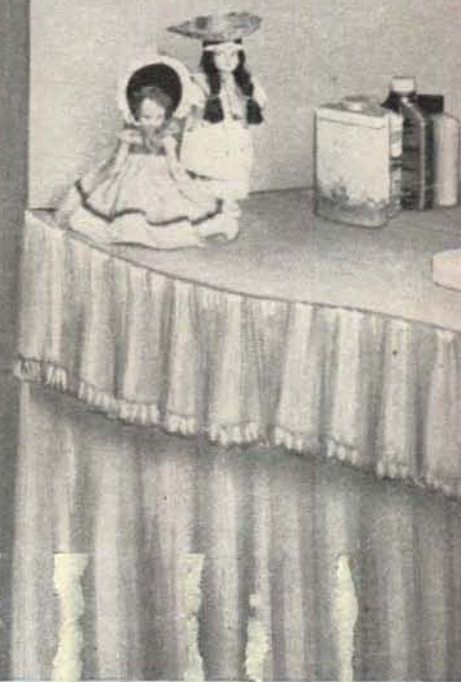
HOW TO:

Stop Pipe Leaks

***Put a Closet in
Your Game Room***

***Prepare Space
for a Dishwasher***

***Add a Trunk to a
Station Wagon***



▲ **CLOSET DOORS THAT "BREATHE"**

A BRAND NEW PUBLICATION

THAT MUST HELP YOU
MAKE MORE MONEY OR
YOU DON'T PAY US A PENNY!

An exciting New idea in Publications solely for —



An Exciting New Idea in Publications Solely For—

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"Profitable Business" will help YOU — no matter what your business — or what you do!

"He Made Me Feel Like A Bride Again"

IT'S hard for me to believe that a few weeks ago I actually thought about leaving my husband! He had become so nervous and irritable — so cross with the children and me that there was just no living with him. He was always "too tired" to do anything — too run-down to have fun with his family. Even our children were puzzled and hurt by his week-in, week-out grumpiness. Frankly we bickered and fought so much I thought our marriage was over.

When Jim finally went to our family doctor, the examination proved there was nothing really wrong. The doctor said Jim's condition was merely caused by an easily corrected **nutritional deficiency** in his diet. You can imagine how shocked I was to discover that even though Jim was well-fed, he was actually poorly nourished due to a lack of vitamins, minerals and lipotropic factors.

Just when things looked blackest, we learned about the famous Vitasafe Plan through an ad in our newspaper. It told how other people with Jim's condition had been helped by taking just one Vitasafe Capsule a day. Naturally, we sent for a trial month's supply. What a difference it has made! Vitasafe High-Potency Capsules have helped him snap back with increased vigor and vim. I'm so happy, I feel like a bride again! Perhaps someone in your family feels tired and run-down because of a nutritional deficiency. Why don't you take advantage right now of this sensational trial offer as we did?



A dramatization posed by professional models.



25¢ just to help cover shipping expenses of this
FREE 30 days supply
HIGH-POTENCY CAPSULES

LIPOTROPIC FACTORS,
VITAMINS and MINERALS

Safe nutritional formula containing 27 proven ingredients: Glutamic Acid, Choline, Inositol, Methionine, Citrus Bioflavonoid, 11 Vitamins (including blood-building B-12 and Folic Acid) plus 11 Minerals.

To prove to you the remarkable advantages of the Vitasafe Plan... we will send you, without charge, a 30-day free supply of high-potency VITASAFE C.F. CAPSULES so you can discover for yourself how much stronger, happier and peppier you may feel after a few days' trial! Just one of these capsules each day supplies your body with over *twice* the minimum adult daily requirements of Vitamins A, C, and D... *five times* the

minimum adult requirement of Vitamin B-1 and the full concentration recommended by the Food and Nutrition Board of the National Research Council for the other four important vitamins! Each capsule contains the amazing Vitamin B-12 — one of the most remarkable nutrients science has yet discovered — a vitamin that actually helps strengthen your blood and nourish your body organs.

Glutamic Acid, an important protein derived from natural wheat gluten, is also included in Vitasafe Capsules. And to top off this exclusive formula, each capsule now brings you an important dosage of Citrus Bioflavonoid. This formula is so complete it is available nowhere else at this price!

WHY YOU MAY NEED THESE SAFE HIGH-POTENCY CAPSULES

As your own doctor will tell you, scientists have discovered that not only is a daily minimum of vitamins and minerals, in one form or another, absolutely indispensable for proper health... but some people actually need *more* than the average daily requirements established by the Food and Nutrition Board of the National Research Council. If you tire easily... if you work under pressure, subject to the stress of travel, worry and other strains... then you may be one of the people who needs this extra supply of vitamins. In that case, VITASAFE C.F. CAPSULES may be "just what the doctor ordered" — because they contain the *most frequently recommended* food supplement formula for people in this category!

POTENCY AND PURITY GUARANTEED

There is no mystery to vitamin potency. As you probably know, the U.S. Government strictly controls each vitamin manufacturer and requires the exact quantity of each vitamin and mineral to be clearly stated on the label. This means that the purity of each ingredient, and the sanitary conditions of manufacture are carefully controlled for your protection! When you use VITASAFE C.F. CAPSULES you can be sure you're getting exactly what the label states... *pure* ingredients whose beneficial effects have been proven time and again!

WHY WE WANT YOU TO TRY A 30-DAY SUPPLY — FREE!

We offer you this 30-day free trial of valuable VITASAFE C.F. CAPSULES for just one reason. So many persons have already tried them with such astounding

results... so many people have written in telling us how much better they felt after only a short trial... that we are absolutely convinced that you, too, may experience the same feeling of improved well-being after a similar trial. In fact, we're so convinced that we're willing to back up our convictions with our own money. You don't spend a penny for the vitamins! A month's supply of similar vitamin capsules, if it were available at retail, would ordinarily cost \$5.00.

AMAZING PLAN SLASHES VITAMIN PRICES ALMOST IN HALF

With your free vitamins you will also receive complete details regarding the benefits of an amazing new Plan that provides you regularly with all the factory-fresh vitamins and minerals you will need. You are under no obligation to buy anything! If after taking your free capsules for three weeks you are not entirely satisfied, simply return the handy postcard that comes with your free supply and that will end the matter. Otherwise it's up to us — you don't have to do a thing — and we will see that you get your monthly supplies of capsules on time for as long as you wish, at the low, money-saving price of only \$2.78 per month — a saving of 45% — Mail coupon now!

SPECIAL PLAN FOR WOMEN

Women may also suffer from lack of pep, energy and vitality due to nutritional deficiency. If there is such a lady in your house, you will do her a favor by bringing this announcement to her attention. Just have her check the "Women's Plan" box in the coupon.

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EACH DAILY VITASAFE CAPSULE FOR MEN CONTAINS

Choline Bitartrate	31.4 mg.	Niacin Amide	40 mg.
Inositol	15 mg.	Calcium	4 mg.
di-Methionine	10 mg.	Pantothenate	2 I.U.
Glutamic Acid	50 mg.	Vitamin E	0.5 mg.
Lemon Bioflavonoid	5 mg.	Folic Acid	75 mc.
Complex	5 mg.	Calcium	58 mg.
Vitamin A	12,500 USP Units	Phosphorus	38 mg.
Vitamin D	1,000 USP Units	Iron	0.04 mg.
Vitamin C	75 mg.	Cobalt	0.04 mg.
Vitamin B ₁	5 mg.	Copper	0.45 mg.
Vitamin B ₂	2.5 mg.	Manganese	0.5 mg.
Vitamin B ₆	0.5 mg.	Molybdenum	0.1 mg.
Vitamin B ₁₂	2 mc.	Iodine	0.075 mg.
		Potassium	2 mg.
		Zinc	0.5 mg.
		Magnesium	3 mg.

SPECIAL PLAN FOR WOMEN ALSO AVAILABLE

CHECK COUPON IF DESIRED.

Mail Coupon To **VITASAFE CORPORATION,**

43 West 61st Street, New York 23, N.Y.

or when in New York visit the VITASAFE PHARMACY, 1860 Broadway at Columbus Circle

IN CANADA: 394 Symington Ave., Toronto 9, Ontario

FILL OUT THIS NO RISK COUPON TODAY!

VITASAFE CORP. K-87

43 West 61st Street, New York 23, N. Y.

Yes, I accept your generous no-risk offer under the

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Vitasafe Capsules as checked below:

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I ENCLOSE 25¢ PER PACKAGE for packing and postage.

Name.....

Address.....

City.....Zone.....State.....

This offer is limited to those who have never before taken advantage

of this generous trial. Only one trial supply of each formula per

coupon.

IN CANADA: 394 Symington Ave., Toronto 9, Ont.

(Canadian Formula adjusted to local conditions.)

One of our BEST Values!



**2.9 AMP.
HEAVY
DUTY**

1/4\"/>

with Jacobs Geared Chuck & Key

Reg. \$39.95—Our Price

14⁹⁵

Ask any expert and he'll always say "RAM for Heavy Duty Work". Not just an ordinary 2, 2 1/4 or 2 1/2 amp unit, but a powerful full 2.9 AMP. drill to do every heavy duty job in home, shop or industry. Built to take years of rough-tough use. Newer, more rugged motor gives 1/4" capacity in hard wood and 1/4" capacity in steel with a full load speed of 1200 R.P.M. Durable, mirror finished, lightweight aluminum housing. Features Universal, series wound AC-DC motor; heavy duty multiple Thrust ball bearings; automatic release trigger switch with locking pin; 6 ft. 2 conductor, UL approved cord and plug. Standard 115 V. AC-DC. This powerhouse measures 9" in length yet weighs only 3 1/2 lbs. If you've ever needed a drill or find that your present 1/4" job just won't do the things you expect of it, ORDER THIS 2.9 AMP. 1/4" RAM DRILL TODAY! Limited quantities.

36" FLEXIBLE SHAFT

For Precision Working—Hard to Get At Places!

Reg. \$9.95—Now **\$4⁹⁵**

This handy flexible shaft with complete handle increases the utility of your electric drill, electric motor, grinder or drill press. One end fits into any 1/4" drill—other end has chuck to accept all tools and accessories with shanks up to 1/4". Easily attached to do grinding, carving, drilling, sanding, polishing, buffing, slotting, engraving, etching, etc., on wood, metal, glass and plastic. The flexible shaft is tamper-proof, sealed and designed for lifetime service. Can be operated at speeds up to 6,000 R.P.M.



Lifetime Grit HANDY SANDER

Tungsten Carbide
Grit Brazed on Steel

New lifetime abrasive miracle tungsten carbide grits brazed on steel gives a diamond-like cutting hardness. Perfectly finishes wood, plaster, plastic or composition materials. Ideal for dry wall joints, all types of wallboard. Never needs replacing—always stays sharp! Sands twice as fast as sandpaper—does not tear like sandpaper! Easily cleaned. Complete kit includes easy-hold birch sanding block, one coarse grit shoe and one fine grit shoe. Lifetime guaranteed.

\$2⁰⁰

plus 20c pp. & hdig.



Complete Power Tool Accessory Set 100 PIECES

Designed for use in all 1/4" capacity Electric Drills and Motor Chuck.

A complete power tool accessory set that can handle almost any job of grinding, sawing, cutting-off, polishing, buffing, reaming, sanding, drilling, cleaning, etching, etc. KIT CONTAINS:—Wire Wheel, Mounted Grinding Wheels, Rotary File, Abrasive Cartridge Rolls, Circular Saw Blade, Felt Bob and Wheels, Honing Stones, Jewelers Rouge, Buffing Wheels, Midget Steel Cutters, Bristle Brushes, Abrasive Sheets and sufficient Arbors to accommodate all the unmounted items.

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Perfect for Speed **\$7⁸⁸**

plus 12c pp. & hdig.

Just imported from West Germany, these 13 precision Chrome Vanadium Drills, from 1/16" thru 1/4" by 6ths are set in two-sleeve steel, indexed container for easy and instant selection. Full jobber length shanks. Easily and cleanly bite through toughest steels, woods, plastics, iron and aluminum. Unconditionally guaranteed for thousands of drillings.

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Send check or money order.

If C.O.D. fees extra. Money-Back Guarantee.

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WORKBENCH volume 15 • number 1

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I'd like to give this to my fellow men... while I am still able to help!

I was young once, as you may be—today I am older. Not too old to enjoy the fruits of my work, but older in the sense of being wiser. And once I was poor, desperately poor. Today almost any man can stretch his income to make ends meet. Today, there are few who hunger for bread and shelter. But in my youth I knew the pinch of poverty; the emptiness of hunger; the cold stare of the creditor who would not take excuses for money. Today, all that is past. And behind my city house, my

summer home, my Cadillacs, my Winter-long vacations and my sense of independence—behind all the wealth of cash and deep inner satisfaction that I enjoy—there is one simple secret. It is this secret that I would like to impart to you. If you are satisfied with a humdrum life of service to another master, turn this page now—read no more. If you are interested in a fuller life, free from bosses, free from worries, free from fears, read further. This message may be meant for you.

By Victor B. Mason

I am printing my message in a magazine. It may come to the attention of thousands of eyes. But of all those thousands, only a few will have the vision to understand. Many may read; but of a thousand only you may have the intuition, the sensitivity, to understand that what I am writing may be intended for you—may be the tide that shapes your destiny, which, taken at the crest, carries you to levels of independence beyond the dreams of avarice.

Don't misunderstand me. There is no mysticism in this. I am not speaking of occult things; of innumerable laws of nature that will sweep you to success without effort on your part. That sort of talk is *rubbish*! And anyone who tries to tell you that you can *think* your way to riches without effort is a false friend. I am too much of a realist for that. And I hope you are.

I hope you are the kind of man—if you have read this far—who knows that anything worthwhile has to be *earned*! I hope you have learned that there is no reward without effort. If you have learned this, then you may be ready to take the next step in the development of your karma—you may be ready to learn and use the secret I have to impart.

I Have All The Money I Need

In my own life I have gone beyond the need of money. I have it. I have gone beyond the need of gain. I have two businesses that pay me an income well above any amount I have need for. And, in addition, I have the satisfaction—the deep satisfaction—of knowing that I have put more than three hundred other men in businesses of their own. Since I have no need for money, the greatest satisfaction I get from life, is sharing my secret of personal independence with others—seeing them achieve the same heights of happiness that have come into my own life.

Please don't misunderstand this statement. I am not a philanthropist. I believe that charity is something that no proud man will accept. I have never seen a man who was worth his salt who would accept

something for nothing. I have never met a highly successful man whom the world respected who did not sacrifice something to gain his position. And, unless you are willing to make at least half the effort, I'm not interested in giving you a "leg up" to the achievement of your goal. Frankly, I'm going to charge you something for the secret I give you. Not a lot—but enough to make me believe that you are a little above the fellows who merely "wish" for success and are not willing to sacrifice something to get it.

A Fascinating and Peculiar Business

I have a business that is peculiar—one of my businesses. The unusual thing about it is that it is needed in every little community throughout this country. But it is a business that will never be invaded by the "big fellows". It has to be handled on a local basis. No giant octopus can ever gobble up the whole thing. No big combine is ever going to destroy it. It is essentially a "one man" business that can be operated without outside help. It is a business that is good summer and winter. It is a business that is growing each year. And, it is a business that can be started on an investment so small that it is within the reach of anyone who has a television set. But it has nothing to do with television.

This business has another peculiarity. It can be started at home in spare time. No risk to present job. No risk to present income. And no need to let anyone else know you are "on your own". It can be run as a spare time business for extra money. Or, as it grows to the point where it is paying more than your present salary, it can be expanded into a full time business—overnight. It can give you a sense of personal independence that will free you forever from the fear of lay-off, loss of job, depressions, or economic reverses.

Are You Mechanically Inclined?

While the operation of this business is partly automatic, it won't run itself. If you are to use it as a stepping stone to independence, you must be able to work with your hands, use such tools as hammer and screw driver, and enjoy getting into a pair of blue jeans and rolling up your sleeves. But two hours a day of manual work will keep your "factory" running 24 hours turn-

ing out a product that has a steady and ready sale in every community. A half dollar spent for raw materials can bring you six dollars in cash—six times a day.

In this message I'm not going to try to tell you the entire story. There is not enough space on this page. And, I am not going to ask you to spend a penny now to learn the secret. I'll send you all the information, free. If you are interested in becoming independent, in becoming your own boss, in knowing the sweet fruits of success as I know them, send me your name. That's all. Just your name. I won't ask you for a penny. I'll send you all the information about one of the most fascinating businesses you can imagine. With these facts, you will make your own investigation. You will check up on conditions in your neighborhood. You will weigh and analyze the whole proposition. Then, and then only, if you decide to take the next step, I'll allow you to invest \$15.00. And even then, if you decide that your fifteen dollars has been badly invested I'll return it to you. Don't hesitate to send your name. I have no salesmen. I will merely write you a long letter and send you complete facts about the business I have found to be so successful. After that, you make the decisions.

Does Happiness Hang on Your Decision?

Don't put this off. It may be a coincidence that you are reading these words right now. Or, it may be a matter that is more deeply connected with your destiny than either of us can say. There is only one thing certain: If you have read this far you are interested in the kind of independence I enjoy. And if that is true, then you must take the next step. No coupon on this advertisement. If you don't think enough of your future happiness and prosperity to write your name on a postcard and mail it to me, forget the whole thing. But if you think there is a destiny that shapes men's lives, send your name now. What I send you may convince you of the truth of this proverb. And what I send you will not cost a penny, now or at any other time.

VICTOR B. MASON

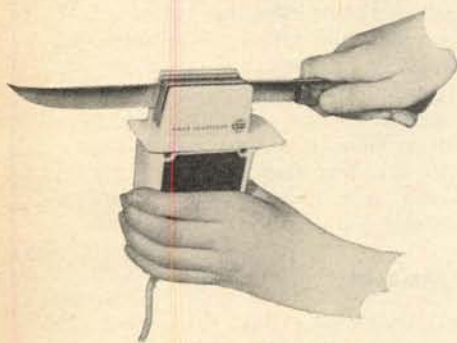
1512 Jarvis Ave., Suite M-6-A
CHICAGO 26, ILLINOIS



keeping up with craft and home products

In communicating with companies whose products are described in this department, please mention **WORKBENCH**.

Electric Knife Sharpener



HERE'S A completely different kind of electric knife sharpener that strokes a knife blade to sharpness, instead of grinding it with a wheel. Simply hold the sharpener in your hand and draw knife blade through the guide slots. Precision guides and specially shaped stone assure sharpening at correct angle. Quick, safe . . . anyone can use it. Compact design permits tucking sharpener into drawer between uses. Beautifully styled ivory plastic case with russet vinyl panels. Sells for \$11.95 from Burgess Vibrocrafters, Grayslake, Illinois.

Quick Acting Furniture Refinisher



A REVOLUTIONARY new idea—instant furniture refinishing—has been developed by the Jiff Chemical & Manufacturing Company of Minneapolis, Minnesota, and Spokane, Washington.

The firm is marketing a new do-it-yourself product—Nufin—which will restore any painted, varnished or lacquered surface in a matter of minutes; bringing back the original finish and appearance. A handy Nufin kit contains all the ingredients needed to do a complete refinishing job, including Nufin Remover, Nufin Finish, Nufin Clear Coat, and appli-

cators. Nufin Remover takes off waxes and greases leaving the finish to be recovered clean and dry.

Nufin Finish contains a stain and a hard, durable plastic coating which resists salt, moisture, heat and most acids. Alcohol and water will not mar Nufin's finish.

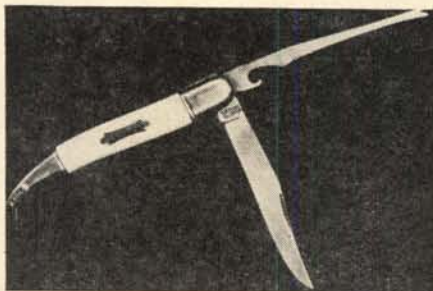
Nufin Clear Coat may be applied the same as Nufin Finish on natural or painted surfaces. It keeps paint from fading, oxidizing, peeling or staining and brings out natural depth of wood grains. Nufin Clear Coat also can be used as a blend with Nufin Finish to obtain any shade in matching your present furniture.

Nufin kits are available in four popular finishes—walnut, maple, mahogany and light oak.

In addition to restoring furniture, Nufin kits may be used to refinish boats, showcases, panelled walls, cabinets, gun stocks and fishing rods. Nufin Clear Coat can be used as a preservative, for leather, brass, chrome, wrought iron and other metals.

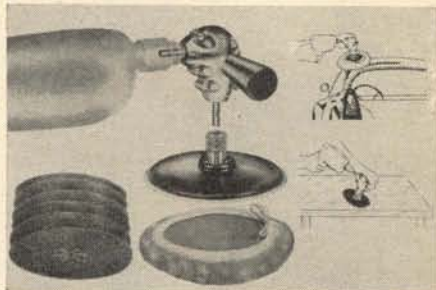
Inquiries concerning Nufin should be addressed to: Jiff Chemical and Manufacturing Co., 5925 Highway Seven, Minneapolis 16, Minnesota.

Sportsman's Utility Knife



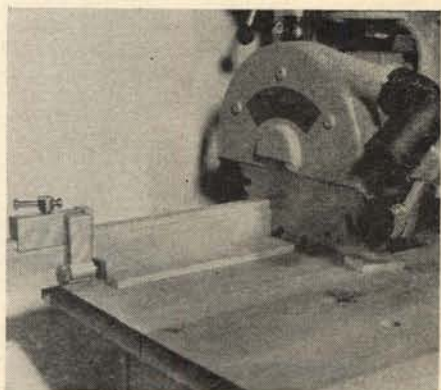
WONDERFUL FOR fishing, hunting, camping and all-around general usage is this utility knife. Simulated mother-of-pearl handle with protective steel caps on both ends. Two magnetized 4" tempered steel blades; one sharp blade for cutting, the other blade has hook disgorging, scaler, cap lifter. Five inches long, closed. Attached ring allows knife to be carried on belt. Made in Solingen, West Germany. Sells for \$2, postpaid, from Kirschnick, 5046 Eagle Rock Blvd., Los Angeles 41, California (no COD's please).

Angle Buffer Fits Drill



HERE IS the perfect tool for buffing and sanding. Brand new "Arco 2-Speed Angle-Buffer" slips into the chuck of any electric drill and it's ready to work. It reduces drill speed by half to prevent burning when polishing furniture, autos, etc. It doubles drill speed for smoothest sanding finishes. These are the speeds preferred by professional cabinetmakers, auto polishing companies, etc., in their work. The tool's swivel angle drive and flexible rubber head permit use at any angle on flat, curved or irregular objects. Includes 5" rubber head, 5½" lamb's wool polisher, 6 sanding discs and instructions. \$6.50 postpaid. Arrow Metal Products Co., Dept. WBP, 421 W. 203 St., N.Y. 34, New York.

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gle piece. The Justo-Stop prevents the workpiece from moving while it is being cut. This is especially important when an angle is involved, when the saw is not very sharp, when trimming ends, or when the wood is hard. All these conditions compound each other. When cutting more than one piece to the same length, a stop is a must. To gain additional accuracy, professional woodworkers and fine cabinetmakers use a wooden extension rail fastened to the miter gauge. This lends support, and prevents whipping of the workpiece while it is being pushed through the saw. This support cannot be gained on the narrow workface of the miter gauge alone, especially when cutting the longer lengths. Up until now if you used the unhandy iron rods supplied with most saws, you could not avail yourself of the advantages of the extension rail, nor could you gauge lengths greater than 27 inches.

The "Justo-Stop" is made of high quality aluminum alloy with lustrous anodized finish. The steel parts are cadmium plated, and precision engineered. Complete your Power-Saw order direct from the manufacturers, with full ten-day trial on money-back guarantee. Price is \$3.50, postpaid. No C.O.D. orders. R. W. Anderson Co., 1110 West 68th Street, Los Angeles 44, California.

Clamp Lock Kit

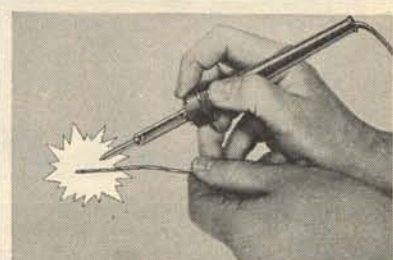


A NEW Clamp-Master Kit, K-45, announced by Punch-Lok Company, Chicago, is housed in an all-steel carrying case finished in red, baked-on enamel. This inexpensive kit contains an assortment of 45 standard Punch-Lok clamps including both preformed and open-end types and a P-38 Loking Tool for tensioning and locking all clamps. After a Punch-Lok clamp is applied, there are no bolts or other projections to catch or snag.

Intended primarily for use in making hose connections and repairs, the Clamp-Master Kit also offers a simple method for clamping, tying, mending and banding on many other objects such as: repairing split planks, fence posts, ladder rails and tool handles; seizing rope ends;

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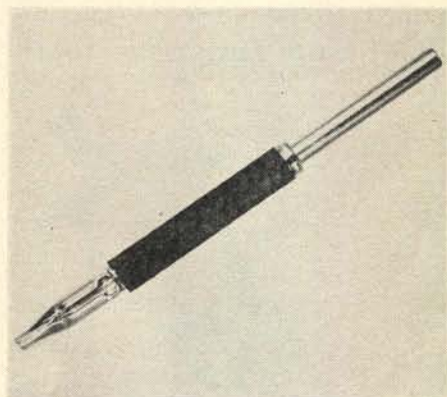
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splicing cable; tying conduit; wrapping pipe insulation; reinforcing crossarms on utility poles, etc.

The range of clamp sizes in the kit will accommodate objects from 1/2-inch to 10 inches in diameter. Available through distributors serving the industrial, construction, marine, nursery and agricultural fields. For details write Punch-Lok Company, 321 North Justine Street, Chicago 7, Illinois.

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ANYONE CAN drive nails with the new Atlas nail driver and screw starter. No more bent nails or smashed fingers. Drives nails straight and safe into wood, metal, concrete or brick. It's safe and easy to use. Place nail into slot, hold tool in position, and drive nail into place. The tool directs the nail straight, no matter how badly you hammer and hit the steel guide bar. Makes it easy to drive nails in hard to get at places, also starts screws or bolts with the same positive action. All tool parts are plated and rust-proofed. The steel driver rod is hardened tool steel and plated. This is a valuable time and work-saving tool for everyone who uses a hammer. Priced at \$2, postpaid, from T & M Supply Company, Dept. W, Box 231, Egg Harbor City, New Jersey.

Chrome Refinishing Kit

A NEW chrome refinishing kit, "Touch 'n' Chrome," refinishes rusty chrome with pure, glowing metal.

Developed by a Chicago manufacturer, Yale Engineering Company, Touch 'n' Chrome is not an aluminum paint, as are many products marketed to refinish chrome. The kit consists of Magichrome cleaner, a highly effective chrome cleaner; and Magichrome, a powdered metal in a special base that sets in seconds and polishes to a glowing luster. Impervious to weather, corrosion, or salt, the Touch 'n' Chrome kit is

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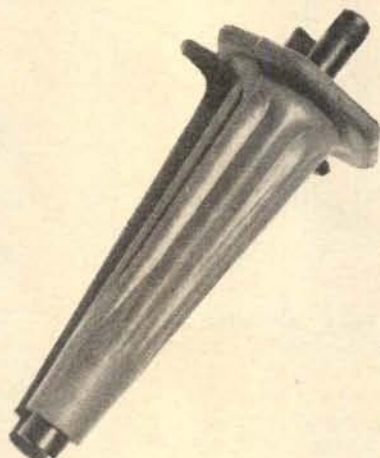
Craft and Home Products

guaranteed to stop further rusting, giving year 'round protection as well as restoring the chrome to its original brilliance.

Priced at \$2.95, the kit is also useful for refinishing plumbing fixtures, boat trim, and bicycles. No tools or equipment are required. All the user needs to do is to clean the chrome with Magichrome cleaner, dab on Magichrome, and polish the finish gently to blend with the original chrome.

Information about the Touch 'n' Chrome kit is available from Yale Engineering Co., 900 No. Franklin, Chicago 10, Illinois.

Efficient Fastening Tool



A NEW fastening tool, designed to take the hard work out of fastening, is now being marketed for home craftsmen by Ramset Fastening System, Olin Mathieson Chemical Corporation, Cleveland, Ohio.

The tool, called Shure-Set, retails for \$7.95. It makes it possible for the do-it-yourself worker to easily fasten through wood and thin steel into concrete, concrete block, cinder block or brick, using a single tool. Shure-Set is designed to get the most efficiency from the energy supplied by a hammer blow. It eliminates the need for drilling.

Shure-Set is as simple to operate as a hammer and nail. A special fastener is inserted into the barrel. The home craftsman then holds the tool against the work surface and drives the fastener by hammering against the anvil or head of the tool with a hammer. A few strokes of a 2½-pound hammer are usually sufficient. No cartridge is required.

Shure-Set fasteners are heat-treated by a special process called austempering which makes them both tough and ductile. They resist cracking under stress. The fasteners sell for \$1 a box.

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3"	21" — 25"	.97	1.03	1.12			
3"	27"	1.01	1.09	1.15			
3"	29 1/2" — 30"	1.18	1.28	1.40			
4"	21 1/4" — 24"	1.44	1.75	1.84			
4"	27"	1.79	1.89	2.05			
4"	34" — 38"	2.00	2.15	2.38			
4"	52 1/2"	2.56	2.76	3.03			
4 1/2"	26"	1.75	1.82	1.98			
6"	44" — 48 1/2"	3.44	3.59	3.92			

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How We Solved A Household Problem

WITH THE trend in kitchen cabinets reverting back to lovely wood finishes, we were more displeased than ever with our stark-white, painted cupboards and drawers. However, we didn't feel we could afford to tear out well-placed, convenient cabinets and start from scratch. It wasn't practical to remove goodness-knows-how-many layers of paint and sand the cabinets, because first grade lumber had not been used in their construction. As a matter of fact, one cupboard had been added sometime after the original ones were built, so there wasn't much chance that the wood would even match.

In searching for a solution, we discovered that most wallpaper and paint companies carry a good selection of wood grain patterns in either ready-pasted or regular wallpaper. The ready-pasted variety comes in 15-yard bolts, containing two separate rolls 18 inches wide, each roll costing \$2.69. The regular wallpaper in these patterns is usually 30 inches wide and costs approximately \$3.29 a 30-square-foot roll.

After measuring our cabinets, we found that with their particular dimensions, the prepasted paper would cut to better advantage. We chose a birch pattern, because it harmonized so well with the yellow linoleum on our drainboards, counter space and floor. We also found a wood-tone-brown enamel that matched this paper exactly. Our plan was to paper the cabinet drawer and door fronts with the wood grain paper, and paint the backs of the doors and spaces between them and around the drawers.

If this method is used, it is obvious that the best effect can be obtained by closely matching the paint color with that of the paper. We learned that it was not necessary to remove or treat the old enamel in any way before papering over it; however, for best results, all handles and drawer pulls should be removed.

Our cabinets embodied twenty-one doors of three different dimensions, and eight drawers, two of which are nine inches wider than all the others.



THE USE of wood grain wallpaper solved for Olive Peabody the problem of how to get away from stark-white kitchen cabinets without too much expense.

This presented a problem until the family held council and decided it was better to center the pattern on every door and drawer front. Then whenever it was necessary, it would be easy to piece by matching pattern on both sides of the 18-inch strip and the cabinets would take on some uniformity and not become a hodge-podge.

The material was cut for one front at a time and each piece was dipped in the water that had been conveniently placed in the kitchen sink before applying it to the surface. After each strip was centered, a good four-inch paintbrush was used to "paint" it on the area securely. It is wise to brush down the center first and work from that point toward the outside with the brush. In this way, there isn't a chance of bubbles forming between the paper and the door. A four-inch brush is more favorable to use because it carries the right amount of weight. It should also be employed to turn the edges smoothly. This can be done with a firm slapping motion of the bristles against the part to be turned. After making sure the paper is secure and will not shrink away from the edge, any extra amount of material can be trimmed with a sharp scissors or razor blade. When trimming, all corners should be mitered on the inside of the door and the underside of the drawers.

One 15-yard bolt, containing two rolls of paper and costing \$5.38, was adequate to cover all twenty-one doors and eight drawers and the time consumed in papering them was three hours.

The painting was purposely left until last because it was felt that the paper could be further sealed by painting over the edge that was carried to the back of the door. Aside from that, it made a neat finish. One quart of enamel, purchased for \$1.59, covered the necessary area and we had a beautiful kitchen for the total expenditure of \$6.97 and a few hours' work. After we had completed the task of painting and papering, we finished our cupboards with a substantial coat of good liquid wax. This helped to give them a closer resemblance to the natural wood and also added protection to the surface.

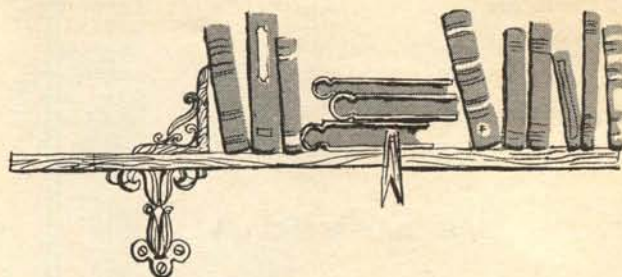
From past experience, we have found that it is wise to purchase extra paint and wallpaper for patching or repairing, because oftentimes patterns are discontinued and occasionally a new batch of paint varies in color. By doing this our expenditure was raised slightly, but we are secure in the knowledge that we have insurance for our lovely kitchen.

*Olive Peabody,
317 South High Street,
Denver 9, Colorado*

Do you have a solution for some specific household maintenance or improvement problem that you know is workable because it has actually worked for you? If so, why not share your solution with our readers? It may help them, too. The problem and its solution should not exceed 750 words but need not be that long. Suitable illustrations will increase the chances that we'll use your contribution. If we do use it, payment will be made to you at our usual rates for text and illustrations. Address contributions to Household Problems Editor, **WORKBENCH**, 543 Westport Road, Kansas City 11, Missouri. If you want your contribution returned, in the event we can't use it, be sure to include sufficient postage.

the craft and home bookshelf

Reviews By Theodore M. O'Leary



Operation of Modern Woodworking Machines by Herman Hjorth and William F. Holtrop 176 pages; illustrated; the Bruce Publishing Co., Milwaukee, Wisconsin; cloth, \$5, softbound, \$3.75.

THE FIRST edition of this book appeared in 1942, the work of Herman Hjorth, a nationally recognized authority on woodworking. Since that time eleven more editions of it have appeared and it has become almost a standard manual of operation for school and home workshops. The revisions in this newest edition have been made by William F. Holtrop, industrial arts professor at Santa Barbara college of the University of California. Mr. Hjorth died in 1951.

This volume deals in detail with the functions, the operations and the techniques involved in the use of the woodworking machine found in the amateur or professional workshop. Separate chapters are devoted to the circular saw, which the authors call the most useful and therefore the most widely used of all woodworking machines, the band saw, the jig saw, the jointer, the planer, the hollow-chisel mortiser, the shaper, the router, the drill press, sanding machines and the woodturning lathe.

Keeping pace with developments in the woodworking machine field, Mr. Holtrop has added to the book a special chapter on the multi-purpose tools and machines, which have been developed by several manufacturers. These machines have been developed to meet the needs of the person who has neither adequate space nor sufficient money to put a number of single purpose machines into his home workshop. These new machines accomplish as a single unit, the work previously done by a number of machines. Those presented in this book are the Shopsmith, the Deltashop and the Power Shop. Mr. Holtrop makes no attempt to show the superiority of one of these machines over the others. Either in their basic form, or with the addition of accessories, these machines can perform *virtually every* operation performed by the single purpose machines described in the book.

PROBABLY THE best way to indicate the thoroughness with which the authors present each machine is to list the material presented in the chapter on the circular saw. The authors begin with a description, then present general safety rules for operation of the circular saw. They then take up in order, changing blades, ripping

wide stock, ripping narrow stock, resawing, beveling and chamfering, tapering, rabbeting, cutting shallow rabbets, cutting short pieces to length, cutting longer pieces of stock to length, squaring wide boards to dimensions, mitering long pieces, mitering short pieces, quantity sawing after patterns, mounting a dado on the saw arbor, cutting grooves, cutting dadoes, sawing a series of evenly spaced dadoes, making dado joints, cutting tenons, making a slip joint, making an end-lap joint, making a cross-lap joint, making a spline miter joint, making combination miter joints, cutting straight moldings, cutting cave moldings, care of a circular saw.

Similarly thorough treatment is given to each of the other machines. Review tests at the end of each chapter will enable you to check on how well you have absorbed the information presented. While "Operation of Modern Woodworking Machines" is widely used as a textbook, its usefulness is in no way limited to schools, for as Mr. Holtrop points out, it "is intended as a reference book for all beginners in machine woodworking, regardless of age level."

Mosaic Patterns by Edwin Hendrickson 95 pages; illustrated; Hill and Wang, New York City; \$4.95.

THE RECENT and rapid growth of interest in making his own mosaics on the part of the amateur has created a demand for attractive and suitable patterns. Edwin Hendrickson, whose mosaic kits, and book, "Mosaics: Hobby and Art," played an important part in sparking the new interest in mosaics, has moved to help meet that demand with a volume containing seventy-six patterns, four of them in color.

All of the patterns are presented on grids of squares, which makes it easy for the craftsman to transfer them to backings and to enlarge them if he wants to do so. The squares are all $\frac{1}{4}$ inch. By increasing the size of the squares you can enlarge the patterns, a system with which readers of this magazine are well-acquainted. In all of the black and white patterns, different shades of gray are employed to indicate color areas and so guide you in planning the mosaics. Color possibilities are virtually endless.

On the last pages of the book are

descriptions of each pattern with color suggestions, but you do not have to follow such color suggestions if you have ideas of your own. The pattern descriptions also include suggestions as to functions for which each pattern is particularly well-suited. For instance, a bottle and glass design is recommended as a wall hanging behind sinks and bars or for the top of a cocktail table. A whale is suggested as a good design for small wall pieces, end tables and planters. A cat and mouse is recommended for use in children's bedrooms and for inserts in bathrooms or kitchens. A fighting cock can be adapted for border designs, round tables, wall pieces, ash trays or lamp bases. Suggestions are also offered as to the type of tesserae (the small pieces of colored material used to make the mosaic) to be used and the amount necessary to produce a mosaic of a specific size.

The patterns were created by several experienced mosaic artists. While many of the patterns are simple, a concentrated effort has been made to keep them from being static and to achieve the effect of motion in each pattern. Dozens of themes and styles are presented—from still life to bullfight scenes, from bright geometrics to soft pastorals. Some of the patterns are based on famous paintings, Monet's "The Sower," for example. Some require little cutting and shaping of the tesserae, while others are executed in more elaborate shapes.

The patterns are preceded by instructions on the techniques involved in making mosaics, including the selection of the tesserae, (Venetian glass and Italian ceramic are generally considered to be the best). Some idea of the color possibilities involved is suggested by the fact that Venetian glass tesserae, comes in 40 to 80 shadings, with approximately five or six shadings in eight or nine color families. Italian ceramic tesserae is available in about 40 colors and American ceramic and porcelain tile, which Hendrickson terms an excellent material, comes in 20 to 40 colors. The technique of mosaic making involves the cutting of the tesserae and its adherence to backings of several different types to form patterns and backgrounds.

Once again Edwin Hendrickson has given new impetus to a craft which until the recent simplification of the techniques involved was considered far beyond the reach of any but the

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professional and the most gifted amateur. With materials now so readily available, and with patterns like these, there is no reason why any craftsman can't make his own mosaics. He will find that they combine usefulness and beauty to a high degree.

Fabricating With Formica

by James M. O'Neill

64 pages; illustrated; The Bruce Publishing Co., Milwaukee, Wisconsin; \$3.50.

PLASTIC LAMINATES such as Formica are produced by a process involving laminating specially prepared papers impregnated with synthetic resins and subjecting them to tremendous heat and pressure. The resulting laminate is notable for its durability and beauty. How to use this ultra-modern material for such things as sink, desk and table tops, recreation room bars and wall covering is the subject of James M. O'Neill's book, which he says is particularly directed to the nonprofessional do-it-yourselfer.

Mr. O'Neill assures his readers that the craftsmanship involved in fabricating with plastic laminates is not difficult, particularly for someone familiar with basic woodworking procedures. Many of the operations involved are of a high school shop level, he asserts. He himself is head of the department of industrial arts of Baldwin high school on Long Island and all of the methods and procedures described in his book have been successfully carried out by his students. Fabrication can be accomplished with simple basic hand tools, but if power tools are available they obviously will aid in saving time.

In most cases plastic laminates must be fabricated, which means glued or cemented to a core, usually plywood. So after providing detailed instructions on the cutting of the laminate, Mr. O'Neill explains all the aspects of fabrication, including selection of the proper adhesive, clamping and choice of a core. A treatment of the edges of the fabrication is also required to produce a finished clean cut line and the author has included two chapters on the various forms which edging takes. He also offers a chapter on the use of the router shaper to achieve many short cuts in making fine fabrications.

THE REMAINDER of the book is devoted to instructions for specific fabrication jobs beginning with a kitchen sink top fabrication and going on to deal with procedures involved in construction of home bars, washer dryer enclosures, bathroom vanity fabrication, hanging fabricated doors, school desk top fabrication, and finally wall fabrication. Formica can be applied to existing walls of plaster (including rough coat plaster if it is steel troweled), plywood, composi-

tion board or poured concrete. New construction offers a choice of base materials with Mr. O'Neill expressing a preference for ½-inch plywood nailed directly to the studs.

As the first book to be devoted entirely to the subject of the fabrication of plastic laminates, this volume helps open up a rewarding field to the home craftsman. In his book Mr. O'Neill speaks not only with the authority of the teacher but with that of the experienced cabinetmaker who has built commercially the same fabrications presented in his book.

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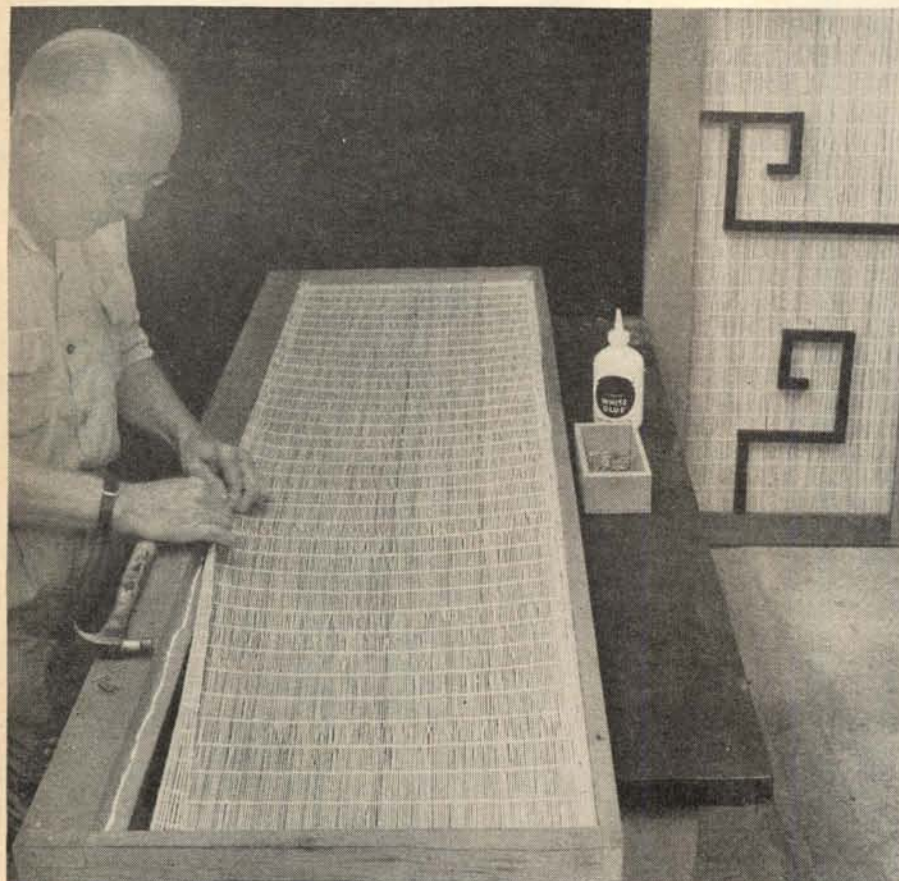
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A simple oriental design will stiffen these

Match-Stick Bamboo Closet Doors

PAUL COREY



PHOTOGRAPH 1—Build your rabbeted door frame; then cut the bamboo to fit inside and glue and nail it into place. Stretch it as tight as you can.

IT'S A good idea to have closet doors that breathe—let fresh air circulate through your clothing. Match-stick bamboo allows good ventilation and looks well too, but it's a bit flimsy. A simple oriental design can take care of that.

The trick is to anchor one end of the pattern in the rabbet of the frame. A duplicate design on the opposite side will sandwich the bamboo and hold it stiff. See Figure A.

Build your door frames out of 2x4's—redwood or clear fir. If the closet opening is wider than 36" then two would be better than one. For two doors use 2x4's for the hinge sides and top and bottom. Rip a 2x4 down the middle for the center or meeting edges.

This frame can be put together with doweled butt joints at the corners or half-lap joints, whichever you prefer. Inside of frame should be rabbeted $\frac{7}{8}$ " x 1" (Figure A).

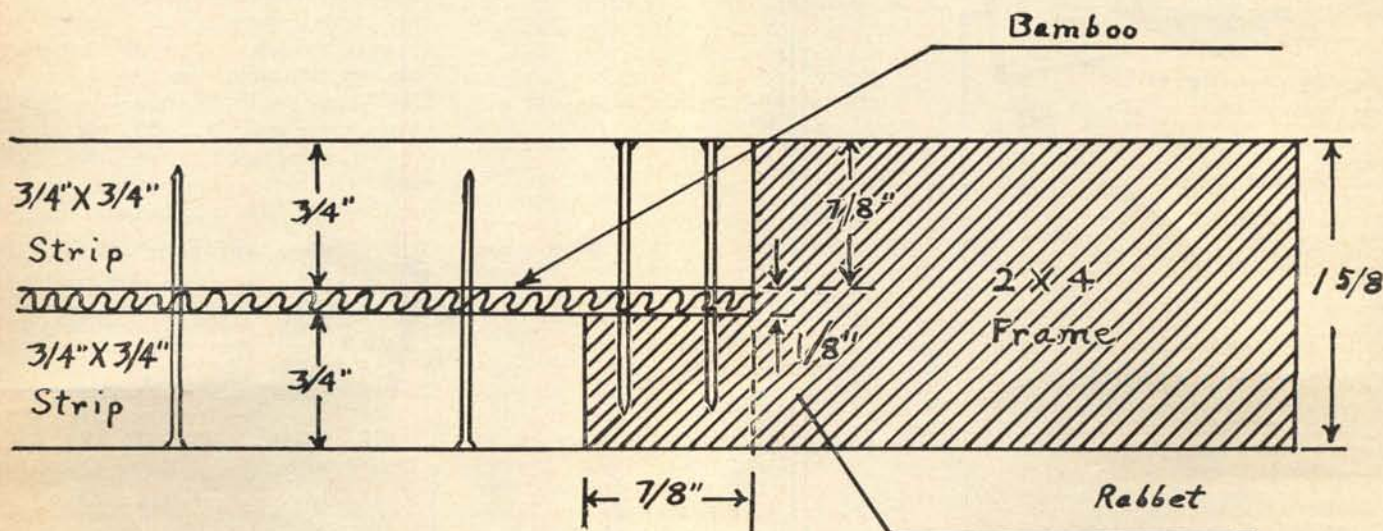


FIGURE A—Detail of rabbet and how design is anchored to frame to sandwich the match-stick bamboo. This is a cross section view which would result from laying the door down flat and sawing through the frame and ripping down the center of a pair of the $\frac{3}{4}$ " x $\frac{3}{4}$ " strips to expose the nails. The $1\frac{1}{8}$ " dimension is roughly the actual thickness of a 2 x 4. The longer $\frac{3}{4}$ " x $\frac{3}{4}$ " strip is anchored in the rabbet of the 2 x 4 frame and two nails were used to get a better purchase. That is the only real hold the strips have to the frame.



PHOTOGRAPH 2—Cut the $\frac{3}{4}$ " x $\frac{3}{4}$ " block for your design and glue and nail them together. These should be in pairs with the anchor end of half of each pair the width of the rabbet longer than the opposite half. Paint the two edges and one surface of each, making sure the unpainted surfaces of the matching pairs will meet on the bamboo.

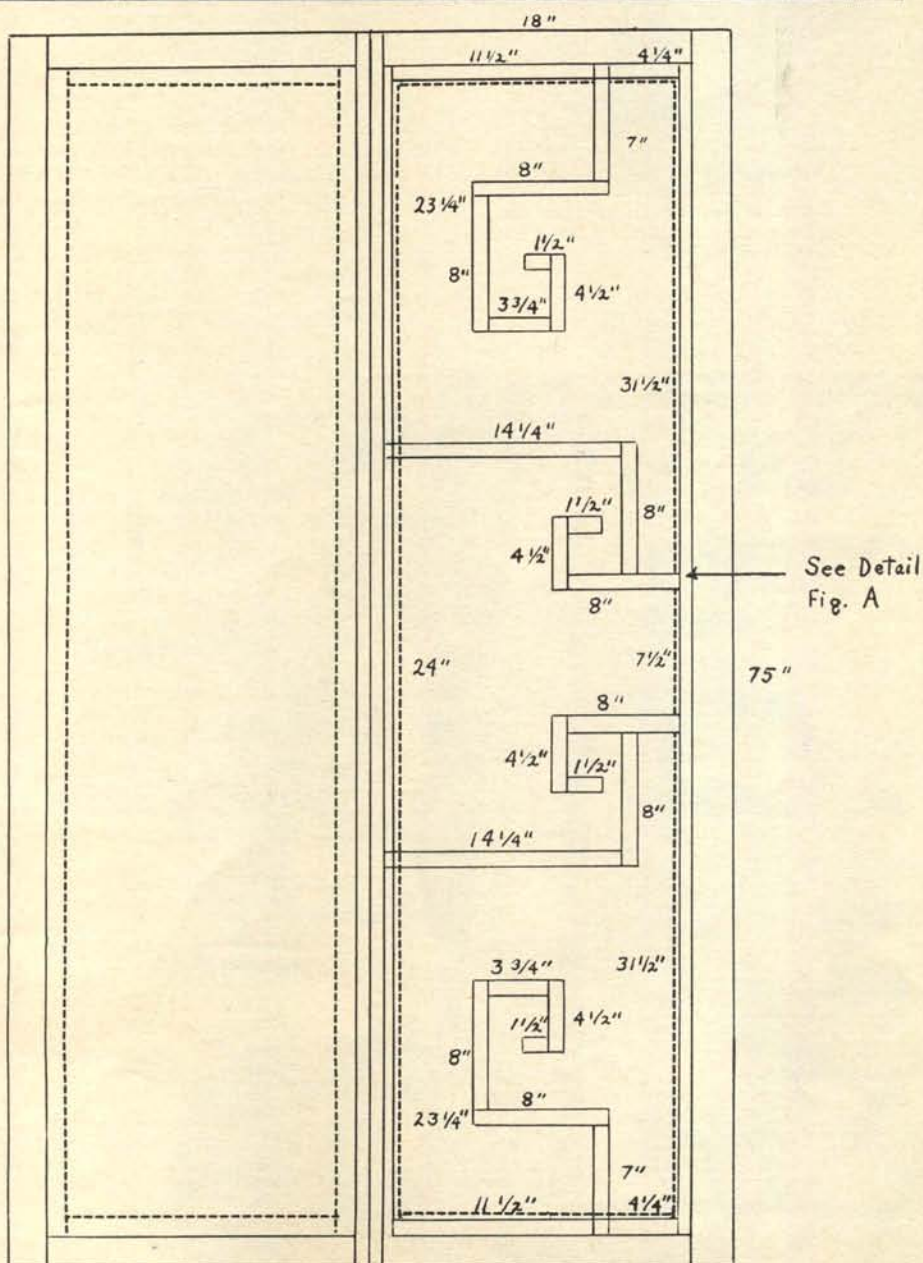
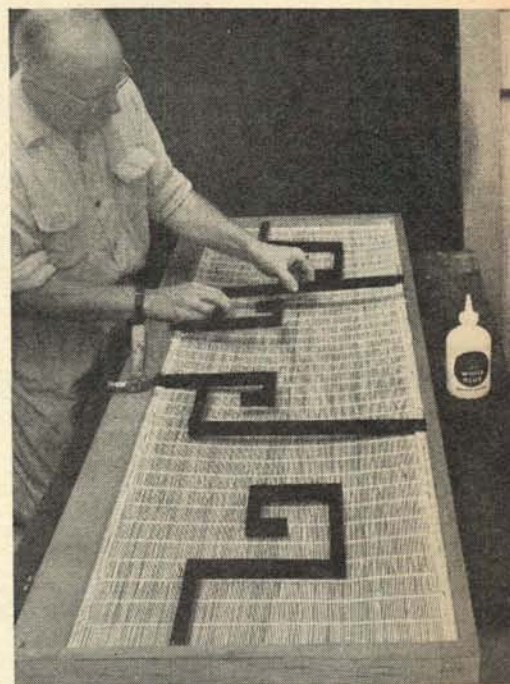


FIGURE B—Parts, positions and design for a double closet door.



PHOTOGRAPH 3—Position the longer halves of the pairs on the rabbeted side of the frame, and glue and nail the ends into the rabbets.

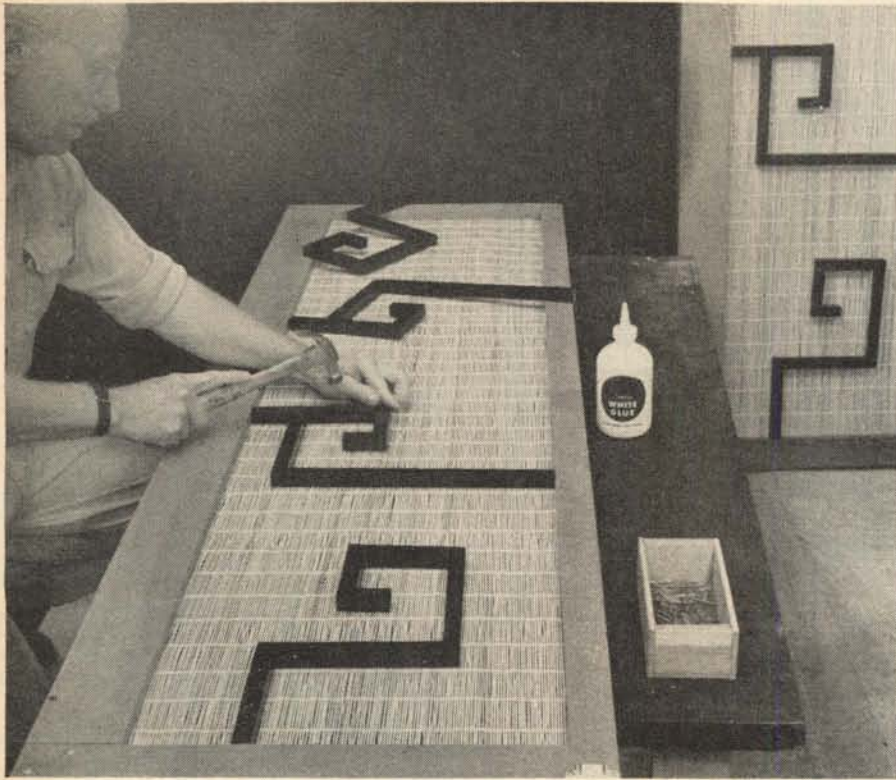
Cut the bamboo to fit the frame, inside the rabbet, and glue and staple it into place (Photograph 1).

Use a softwood, pine or redwood, and rip $\frac{3}{4}$ " x $\frac{3}{4}$ " strips from which to cut your design.

The one thing to keep in mind is that the parts of the design which anchor in the rabbet must be the width of the rabbet longer than the parts on the other side of the bamboo. For this design there are only six such pieces to each door.

If you wish to use this design for your closet doors the only dimension you'll need to check and perhaps make a change in is the width. This will involve the four horizontal pieces that anchor in the rabbet and their opposite halves. See Figure B.

Measure inside the rabbet to determine the difference in width of your doors and the one in the drawing. Shorten or lengthen each of the horizontal pieces in the design by half



PHOTOGRAPH 4—Turn the frame over and glue and nail the shorter of the pairs to the other side. Use $1\frac{1}{2}$ " finishing nails. Make sure they match with the other side and drive nails through and into the opposite pair.

this difference. Then of course you cut the pieces for the opposite side of the bamboo the width of the rabbet shorter than the anchor strips.

Cut the number of $\frac{3}{4}$ " x $\frac{3}{4}$ " blocks necessary for the design and glue and nail these together (Photograph 2). When the glue is dry, sand them smooth and give the two edges and one face two coats of black enamel. Be sure that the unpainted faces of each pair will meet on the bamboo as a gluing surface.

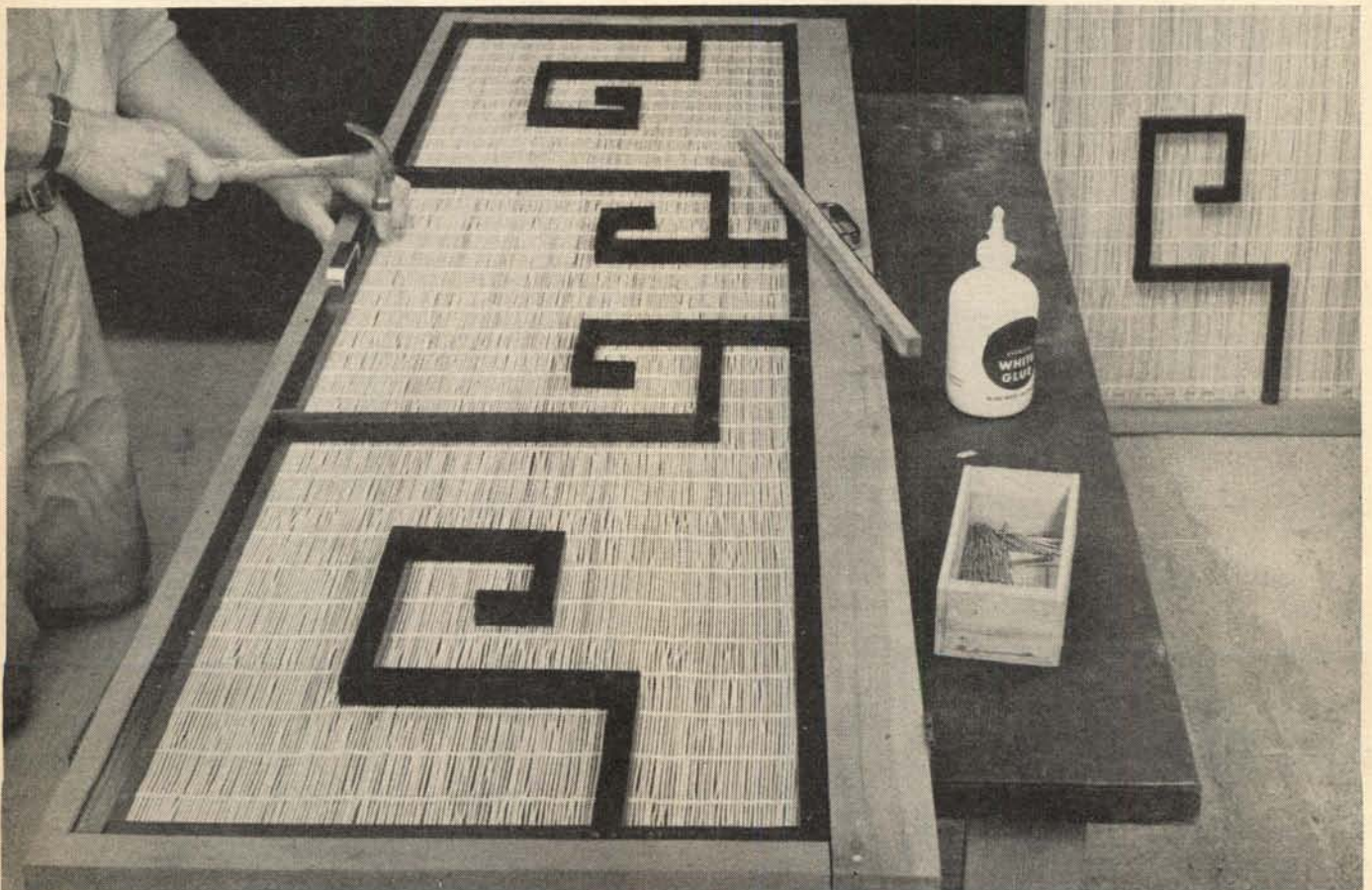
While you're painting, give two edges of several long $\frac{3}{4}$ " x $\frac{3}{4}$ " strips a couple coats of enamel. These you will use to fill in the rabbet after the design is fastened in.

When the paint is dry, position the anchor pieces of the design and glue and nail the ends into the rabbet (Photograph 3). Turn the frame over and glue and nail the opposite half of each pair to the other side. Be sure they match up (Photograph 4).

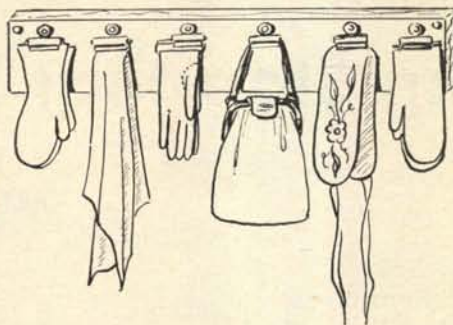
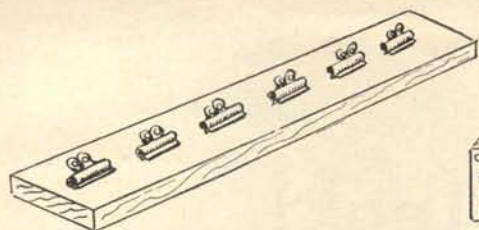
Turn the frame over again and fill in the rabbet with $\frac{3}{4}$ " x $\frac{3}{4}$ " stops as shown in Photograph 5. The handle of the door or doors can be fastened to one of the stop pieces as shown.

The door frames can be finished with clear lacquer or with varnish.

The completed doors in use are shown on the front cover. The End



PHOTOGRAPH 5—Reverse the frame and fill in space between the anchored ends of the design with $\frac{3}{4}$ " x $\frac{3}{4}$ " stops. Unpainted surfaces should be glued and nailed to the bamboo and rabbet. Door handle can be fastened to appropriate one of these strips as shown here.



We Improvised a Mitten Rack

SHIRLEY FOSS DECKELMAN

THE THREE little kittens who lost their mittens had nothing on our children! Their mittens usually reached home, but it was what happened after they got there that caused us to search for a solution.

If the mittens happened to be dry they were flung onto the top shelf of dark depths of the front hall closet to lose themselves with scarves, purses, hats and gloves, never to meet their mates again.

Or, if wet, they were hung on any available nail in the cellar way, with the hazard of being unraveled when yanked off again.

Since the closet shelf is about 5½ feet high behind a row of hangers and clothes and mother is only 5 feet tall, annoyance rose to a high pitch every time school rush was on and a mate to a mitten was missing.

The household counters were searched for some sort of rack but although there were racks for ties, skirts, belts, shoes and so on, nothing was found for mittens or scarves.

There obviously was only one solution, make one. The skirt hanger pinch clips provided inspiration of

a sort, only these type clips moved about on a rod and we wanted a stationary rack. Finally we decided upon a small board, 24 inches long, 3 inches wide and about one-half inch thick, a redwood leftover from our scrapbox.

Six ordinary paper clamps (such as are used on clip boards), the 2½-inch size, costing 10 cents at the local dime store were placed on the board about ¾ of an inch apart. The back part of the clamp which touched the board was screwed tight to the wood through the small hole, while the front piece was left free for pressing down to open the clamp.

A smaller clamp was tried at first but didn't provide enough opening for the heavier hand knit mittens and scarves.

The rack was fastened to the back of the closet door, low enough for little arms to reach. It was so successful we made another which was placed in the cellar entrance for wet, muddy mittens.

No more frayed tempers, aching arms, or mateless mittens in our house!

THE END

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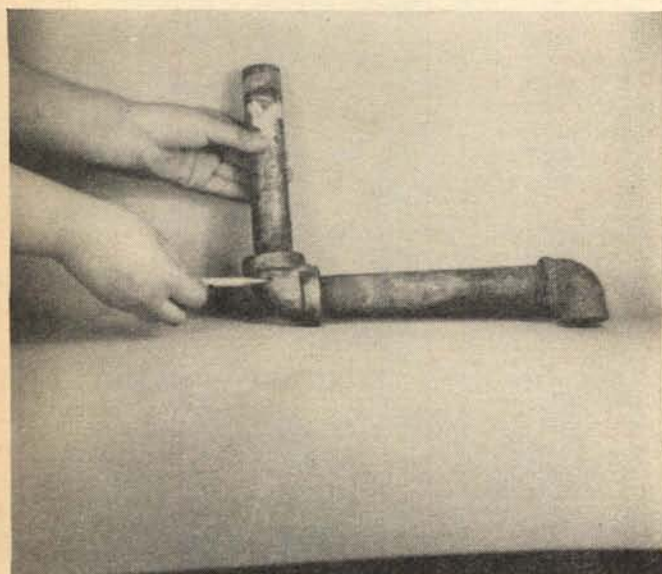
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You can Stop that Leak!

ARTHUR S. GREEN

Many minor pipe leaks will "heal" themselves, but to cure those that persist, try the types of easily applied products described here.



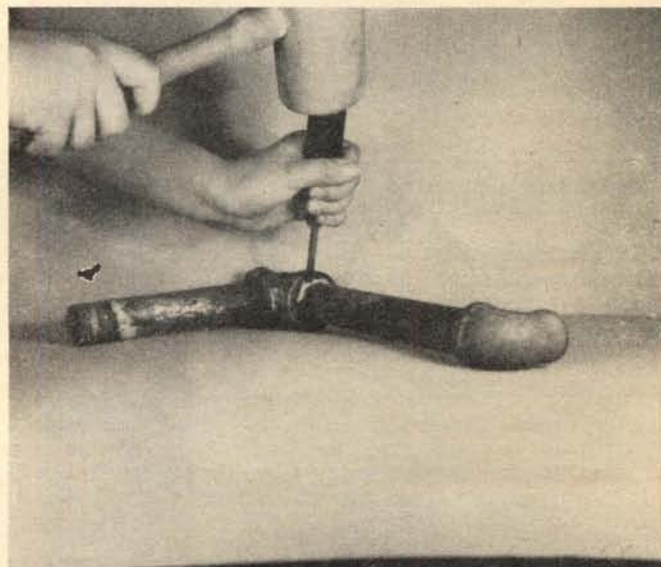
PHOTOGRAPH 1—Pencil points to minute sand hole that caused leak in casting. Pressure from water inside pipe burst it open.



PHOTOGRAPH 2—If the piping involved in a corrosion leak does not have to withstand much water pressure, like a drainpipe, then simply spread liquid solder over the corroded area, building it up in layers as it dries. If it takes pressure, use plastic steel or iron cement.

CURING THOSE aggravating leaks in water pipes for keeps has perpetually been one of the thorniest problems facing homeowners. The most consoling fact about most water pipe leaks is that the particles of rust which result from the corrosive action of the oxygen in the water on the metal in the pipe are enough eventually to seal them shut. But the fact is, that whether a pipe leak amounts to only a once-in-awhile ooze, or whether it's an actual trickle, any persistent leak that does not "heal" itself shut in this way within a few weeks must be stopped. For besides the sheer loss of water, there's always the threat of escaping water in itself causing serious damage to finished rooms in your home—even to the structure itself. And in more cases than not, any leak that doesn't drip itself tight from corrosion, gets progressively worse.

Up until quite recently, a persistent leak in a water pipe or fitting spelled out various makeshift attempts to stop it temporarily, the expense of replacing member parts, or simply putting up with it. But now, thanks to a variety of products—many of them new—that grace your hardware dealer's counters and shelves, there's a better chance of curing those persistent leaks by yourself—and for keeps.



PHOTOGRAPH 3—To tamp a joint leak, first twist lead wool or soft paper into strands, wrap it around the last visible thread next to the fitting, and tap it into the fitting gently with a blunt-edged screwdriver and wooden mallet.

Of course, few cures for a drip are as good as eliminating the cause. But often eliminating the cause just isn't justifiable in terms of one small leak. Such measures as replacing faulty or corroded member piping, installing new fittings like unions to take up the slack in loose pipe thread connections, or installing air chambers to reduce hammering pressures may not be necessary. And in many instances these procedures and all the tightening up of your pipes fail to check a leak.

Here is where the effectiveness of the products that work from the outside comes in. There isn't any one product that is the perfect panacea for all leaks, so let's examine the products in terms of the specific causes of leaks.

Sand Hole Leaks

SAND HOLES are pinpoint holes which result from imperfections in the original casting of elbows, tees, and other fittings. (Don't expect to find a sand hole leak in all pipes and fittings, because virtually all pipes are forged today.) You can tell if a fitting is cast by its rough surface. These sand holes usually appear only on the exterior surface (Photograph 1), but sometimes they are deep enough so that just enough pressure from the water inside the pipe can burst them open.

If the metal in your pipe is more than 1/4-inch thick and must withstand city water pressure, you've got to plug the hole through the entire thickness of the metal with a waterproof hardening material. If the water trickles out under pressure, drain the pipe and tamp the hole with **iron cement**, **plastic steel**, or a **dry pipe compound** by smearing a small gob on the surface of the pipe directly over the hole and then poking it into the hole with a needle or nail point. After plugging the hole, featheredge some of the packing on the surface around the hole for more bonding power.

If the metal in your pipe is thinner than 1/4-inch, or does not hold water pressure, like a drainpipe, simply spread **iron cement**, **plastic steel**, **liquid solder**, or a **dry pipe compound** over the hole and around it with a putty knife, pressing gently over the hole. If you can't drain the pipe to dry it, tamp **plastic pipe covering paste** into and around the hole and wrap **plastic pipe covering tape** around the pipe over the paste.

Corrosion Leaks

INTERIOR OR **exterior corrosion** sometimes accounts for the existence of almost microscopic holes in pipes. Enough of them can create a serious water loss and further corrosion. (Don't confuse this with condensation, however, because condensation only appears when the

temperature of the water in the pipe is considerably lower than the air surrounding it.)

The object in stopping these leaks is to cover the entire surface with a waterproof material that bonds readily to the piping and adds strength and thickness to it at the same time. If the piping is not too thin and does not have to take much water pressure, wipe the surface dry or drain the pipe, being careful not to jar the piping, and spread **liquid solder** or **plastic steel** on the entire surface of the pipe as far as the corrosion extends, building it up in layers as it dries for more strength and thickness (Photograph 2). Still another way is to tape it with **plastic pipe covering tape**. This will insulate it against sweating, too, and cushion it from jarring from the outside.

Break Leaks

BREAKS FREQUENTLY occur in pipes as a result of excess water or steam pressure, an imperfection in the forging of the pipe, receiving a good jar, or damage to the pipe by tightening it with a wrench too much. The leak springs more suddenly than the others and because the water loss is usually the greatest, demands immediate attention.

To seal such a break properly, you must first drain the water from the pipe and allow the edges of the crack to dry out. Then try to close it as much as possible to its original shape with a strong pair of pliers that are padded or even in the jaws of a pipe vise. Then, if the crack is wide and long, pour **liquid steel** or **iron cement** into it, building it up in layers as it dries. To avoid allowing too much excess from dripping into the inside and thereby narrowing the width of the pipe at the break, you may have to allow a small amount of your sealing chemical to thicken by drying it in the air outside the pipe first. Then, just before the gob begins to set, set it into the crack.

If the crack is merely a thin fissure and the pipe takes very little pressure, you can smear **pipe joint compound** available in stick form or **liquid solder** into the crack, but be sure to drain and dry the pipe first and don't allow it to fill with water until the chemicals set.

Thread Leaks

THIS IS the most frequent type of pipe leaks. They usually occur in newly-installed or recently-jarred piping. Regardless of the cause, however, first try tightening up the threads by twisting the pipe or union. If the leak still persists and the pipe has been recently installed, observe the water dripping out of the threads. If it's



PHOTOGRAPH 4—Then spread furnace cement over the area with a putty knife to seal it shut from the outside.



PHOTOGRAPH 5—If you can't get to the fitting to tap material into it, then simply press universal or plumbers' putty into the threads in the joint.

not clear and is slippery between your fingers, this means that the pipe thread dope that was used to lubricate the threads for easier fitting and perhaps for caulking has not yet had a chance to harden or be forced out or dissolved by the water. And if the force of the water has pushed the dope out or dissolved much of it, then the oxygen in the water may not yet have had an opportunity to corrode the metal in the threads and seal the leak. The only thing to do is wait a few weeks and observe.

However, if the leak still persists, and you cannot remove the pipe to redope it, then you have to caulk the openings between the threads. **Iron cement** or **plastic steel** can stop it instantly, but use these only as last resorts. You should first try to seal it by avoiding the use of hardening materials like these that bond so securely in the threads, you'd have to crack the joint open to move it off someday.

So first try caulking or tamping it with bits of **lead wool** or soft paper, twisted into short strings. Wrap these

around the nearest visible thread to the fitting. Then push it into the rest of the threads in the adjoining pipe by tapping it gently with a mallet and blunt-nosed screwdriver (Photograph 3). Then cover this with **furnace cement**, pressing it over the lead wool or paper with your fingers (Photograph 4). Finally, to keep the furnace cement from breaking away, wipe **liquid pipe joint compound** over it, working it into the furnace cement gently. You may still get some temporary leakage, but this is usually due only to the excess water draining out of the furnace cement.

If the leak isn't too persistent and there is merely a sign of extreme dampness around the fitting, or if you can't get at the fitting to tamp material into the threads, then press **plumbers'** or **universal putty** into the fitting beyond the last visible thread next to the fitting (Photograph 5). And, if you can't get this kind of putty, then allow a gob of **liquid pipe joint compound** to dry out a bit in the open and push it into the threads with a putty knife.

THE END

Shelves to fit a Closet Corner



A HAT-and-purse caddy can rescue wasted closet corners and give them a useful function.

Easily built of ordinary building materials, the caddy consists of several pie-shaped shelves held together by a simple framework. On the shelves may be perched hats, purses, gloves, mittens, scarves and other miscellany that usually can't be found when wanted.

As illustrated, the corner caddy has 1-by-2-inch lumber at the outer edges, rabbeted to receive the foot-wide pieces of Masonite $\frac{1}{8}$ " Tempered Presdwood which form the two sides set at right angles to match the closet corner. The sides are fastened with glue and screws to the wood.

Serving as a center support is a spine of $\frac{3}{4}$ " quarter-round. Each of the Masonite shelves, situated one foot apart, is cut in the shape of a quarter-circle. Four holes are drilled, two on each of the straight edges, so the shelf can be fastened with screws to the support, $\frac{1}{2}$ " x $\frac{3}{4}$ " base shoe molding held with glue and screws, with the rounded edge down. All screws are counter-sunk.

The point of each pie-shaped shelf is indented slightly with a file so it will fit around the spine molding.

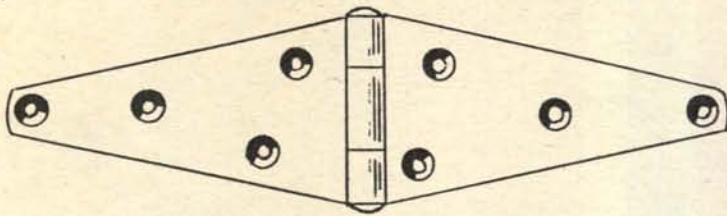
Exposed edges of the shelves are beveled lightly with a sandblock or file.

The corner caddy may be primed and painted or left unfinished.

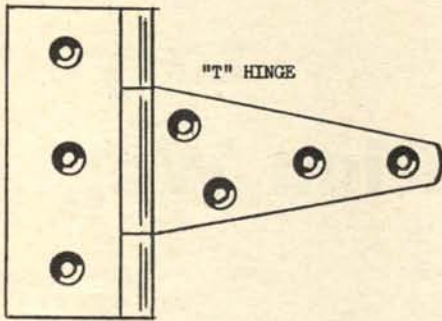
Height of the one illustrated is 6 feet, but the dimensions may be altered to fit any size closet.

THE END

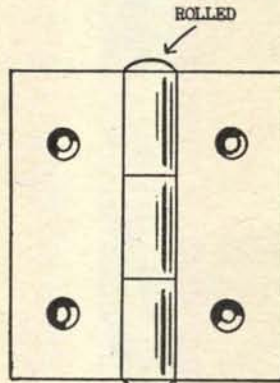
Much hinges on the hinges you use for home workshop and home improvement projects. Here are the facts about the most common types.



PLAIN STRAP HINGE

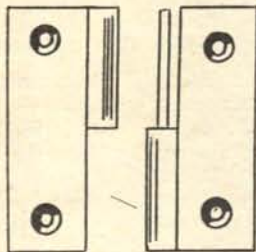


"T" HINGE

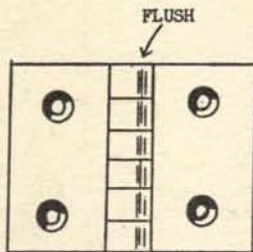


ROLLED

TIGHT PIN BUTT

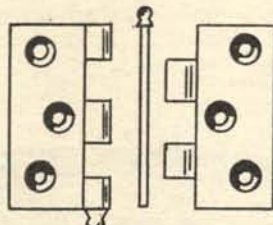


LOOSE JOINT BUTT



FLUSH

PLAIN FLUSH PIN BUTT



LOOSE PIN BUTT

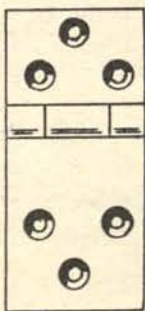
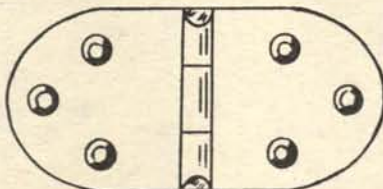
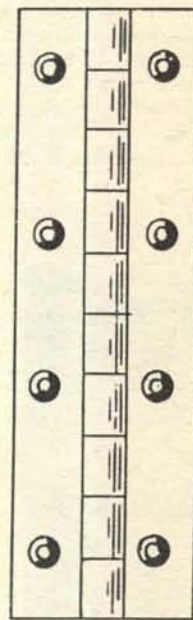


TABLE LEAF
HINGE



ROUND END FLUSH HINGE

TYPES OF HINGES most commonly used around the average house.



CONTINUOUS
HINGE

Taking a look at hinges

ALFRED A. DeCICCO

WHEREVER A door, lid, gate or shutter is used in a project, it is important to the home handyman that he select and use the right hinge. This selection is important because it affects the appearance and utility of the project for which one or more hinges are required.

There are many types of hinges,

and the size, style and weight of each varies according to the purpose for which it is intended. In furniture making, hinges are indispensable for chests, cabinets or related pieces that require close fitting panels or doors that can be attached easily and opened and closed.

To determine the size of hinges to

be purchased (they are made in pairs) a homeowner must know how they will be used in various projects. Should a heavy cabinet door be a part of the project, the hinges will have to carry some weight and they must be of heavier duty.

Although there are many styles and sizes of hinges, the average homeowner should become familiar with about eight or nine of the common hinges since these will be used time and again about the home.

Two of the most popular hinges are wrought steel "strap" and "T" varieties. The strap hinge can be depended upon for good service on massive objects, and it comes in small, medium and large sizes. The steel "T" hinge is a variation of the strap and it is equally suitable for heavy duty, particularly on property gates.

A butt hinge is the family name for several types of hinges that are made of steel and brass in a broad range of sizes; from 1/2-x-1/2 to 2-x-3-inch and larger when opened. In this hinge family is the tight pin butt hinge which has a permanent pin enclosed in the center (barrel). This pin may take the end shape of a ball or bullet or be rolled. It is used a great deal for hanging cabinet fronts, folding legs on tables and outdoor furniture. The larger variety is used for standard doors.

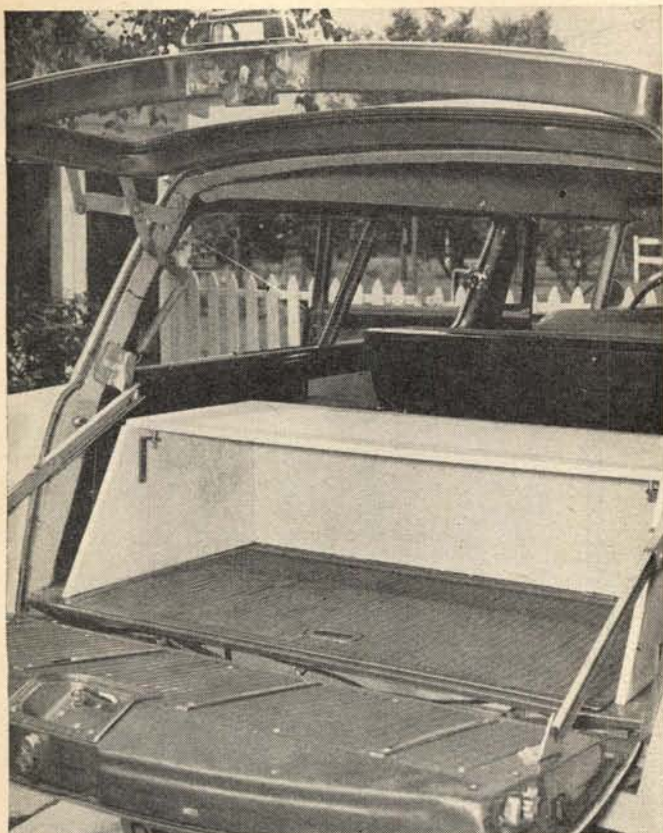
THE LOOSE joint and loose pin hinge are styles that should be used when a door or panel has to be removed occasionally. The loose pin type is made also with identical tight pin. A ball knob at the top and bottom of the pin identifies this hinge.

When assembling a drop-leaf table, for example, the two types of hinges recommended are the leaf hinge or the round end flush. The table leaf hinge is made especially for hanging drop leaves on tables where fancy edge molding calls for placing the hinge screws farther back for reinforcement. The round end flush hinge serves this purpose equally as well, but it is used where more artistic finishing is required.

When attaching a long, movable object to a project, such as the top of a wall desk which folds out, the continuous or piano hinge is best suited to your purpose. The reason is that the continuous hinge not only gives uniform effect, but it distributes strain evenly so as not to weaken any part of the attached door, lid, or other segment of the project.

There are dozens of special varieties of hinges in addition to those described. Some of these complex hinges can be concealed after installation, some are double action, others have built-in springs for automatic closing. However, the average homeowner doesn't have to familiarize himself with these special variety hinges unless he plans on doing more advanced work.

The End



1. FOLDING TRUNK INSTALLED. Access is by dropping tail gate of wagon. Back edge of lid is beveled (hinged edge) so that lid will swing clear back allowing the free edge to rest on the floor. This permits use of the trunk as an open-top compartment if desired. Size of trunk is such that full access is still provided to the spare-tire compartment without removing trunk.

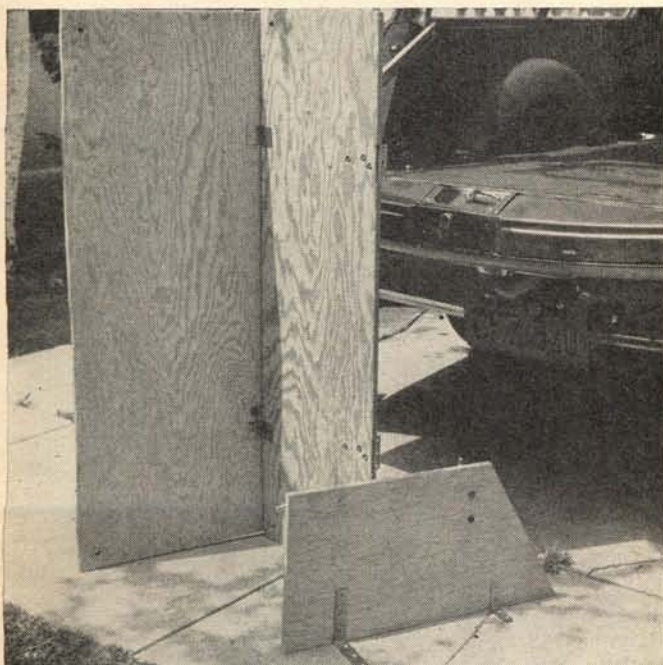
Add a Folding Trunk to your Station Wagon

EARL STOWELL

Miss a trunk on your station wagon? Build in your own then, as Earl Stowell did. He tells you how here.

SINCE OWNING my station wagon I have heard numerous other owners declare in effect: "I love my station wagon, enjoy it more than any car I ever owned, but I miss the trunk. There is no place to put things without letting them be in full view of

passers-by. And, small things, such as a sack of groceries, slide all over the car when I stop or turn." Here is the answer I worked out for these problems. And, it does not detract from the full usefulness of the wagon in any way.



2. TOP, BACK, and one end piece to show mounting angle brackets, location of "T" nuts, and hinge details. Top has been shaved slightly in length to fit between wheel wells when folded down. Before installation, back was trimmed to same length and ends located to fit.



3. SLIDING TOP AND BACK into place for final measurements before covering pieces with vinyl plastic sheet. Allow $\frac{1}{8}$ " in length for vinyl covering.

In reality, two answers are provided: one is a folding trunk that folds down when it is not wanted and which can be removed in less than a minute, and the other is a simple divider-type contraption that gives an open-top compartment when needed. When the divider is not needed, it folds down flat against the floor, out of the way. It, too, can be removed in less than a minute. Measurements are for a 1956 Ford Ranch Wagon. You can adapt them for your own model.

THE PICTURES and figures furnish a complete description of both items. To pick up any items that might not be covered, however, here is a brief description of each, starting with the folding trunk. The trunk is made of plywood, although sheet steel or aluminum would have worked equally well. It requires a little less than half a sheet of $\frac{1}{2}$ " waterproof plywood. Figure 1 shows the layout of the ends, back and top. After cutting out the pieces, install the hinges and angle brackets as shown in Figure 3. Before cutting material, check your wagon's measurements.

Note that each thumbscrew has a $1/16$ " hole drilled through it about halfway along the threaded portion. This is to take a cotter key and a spring so that the thumbscrew will not rattle and will not get lost. The four 3-inch angle brackets are sawed off as shown in Figure 3 and the hole in the short side is drilled out to take the thumbscrew. I had no trouble locating the thumbscrews at the hardware stores, but I had to try several stores before I found the "T" nuts. These are nuts that resemble a tube with a washer across one end. They are installed by drilling a hole clear through the plywood to fit the tube part and then counter-boring to take the washer. The washer end goes opposite the side where the thumbscrew first enters the "T" nut.

Again, remember that measurements given are for a 1956 Ford. You may have to modify them for your wagon.

After the parts are cut out, install the "T" nuts and the hinges. The top hinge was bent $\frac{3}{8}$ " from the center pin so that it came down *inside* the trunk. Also, the hinged edge of the top must be beveled at about a 45-degree angle if you want the trunk lid to fold forward far enough for the free edge to touch the floor. This is extremely convenient if you want to go grocery shopping because you can simply pop the packages into the open compartment, knowing that they will stay there.

Next, install the angle brackets. It is advisable to use machine screws and nuts instead of wood screws because wood screws may tear out after a period of road and engine vibration.

Set the end pieces in place, just outside the spare-tire compartment,

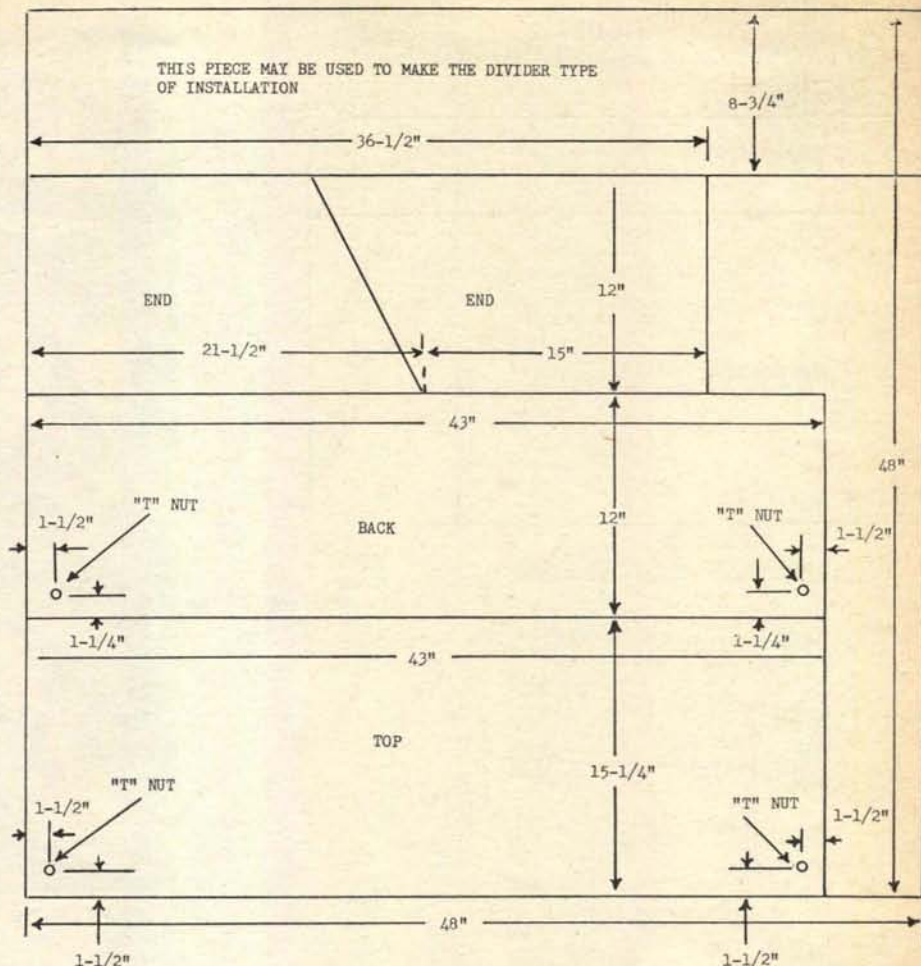
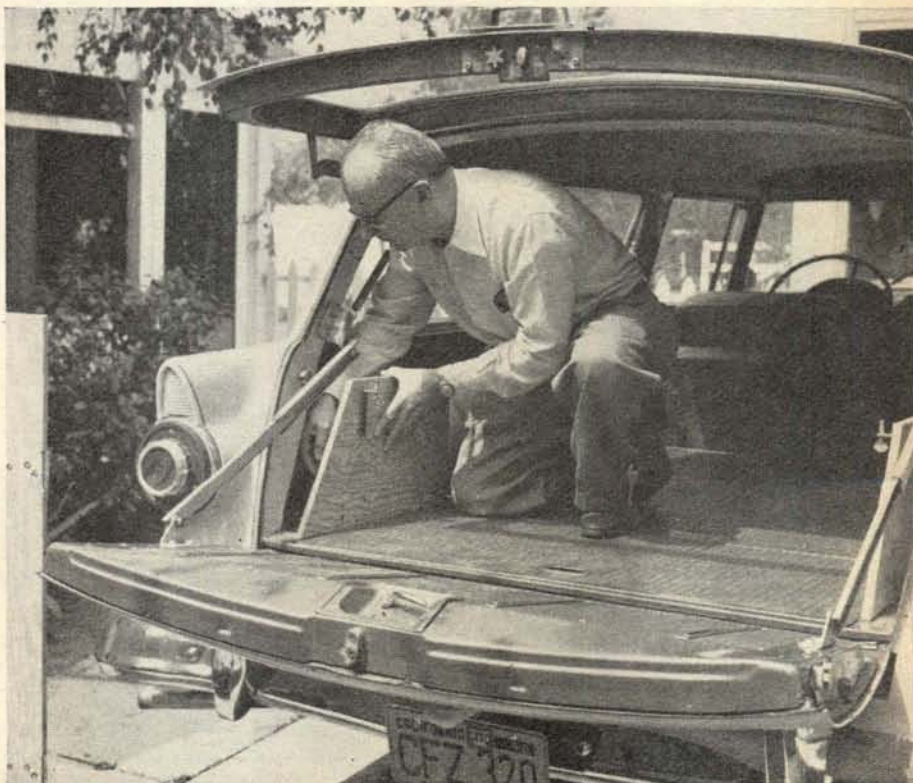


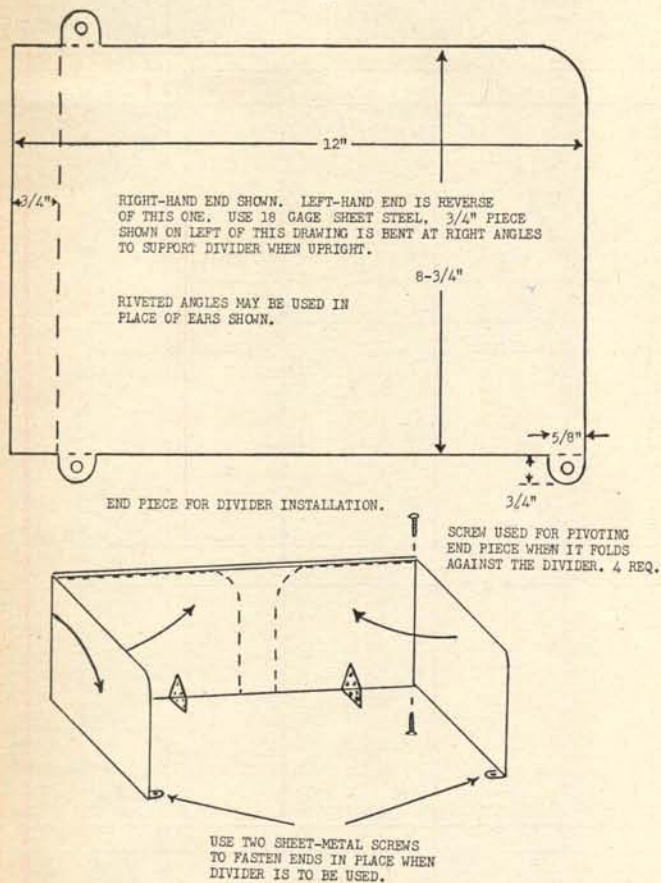
FIGURE 1

Dimensions for parts required for folding trunk and for divider. It uses one-half sheet of $\frac{1}{2}$ " plywood.



4. INSTALLING END PIECE. Each end is fastened to floor of wagon with five sheet-metal screws. A sharp punch was used to make starting hole for the sheet-metal screws.

FIGURE 2
Details of divider-type installation.



5. TRUNK FITTED in place before being covered with vinyl. Allow a little more than $\frac{1}{16}$ " between back and end pieces for the vinyl covering.

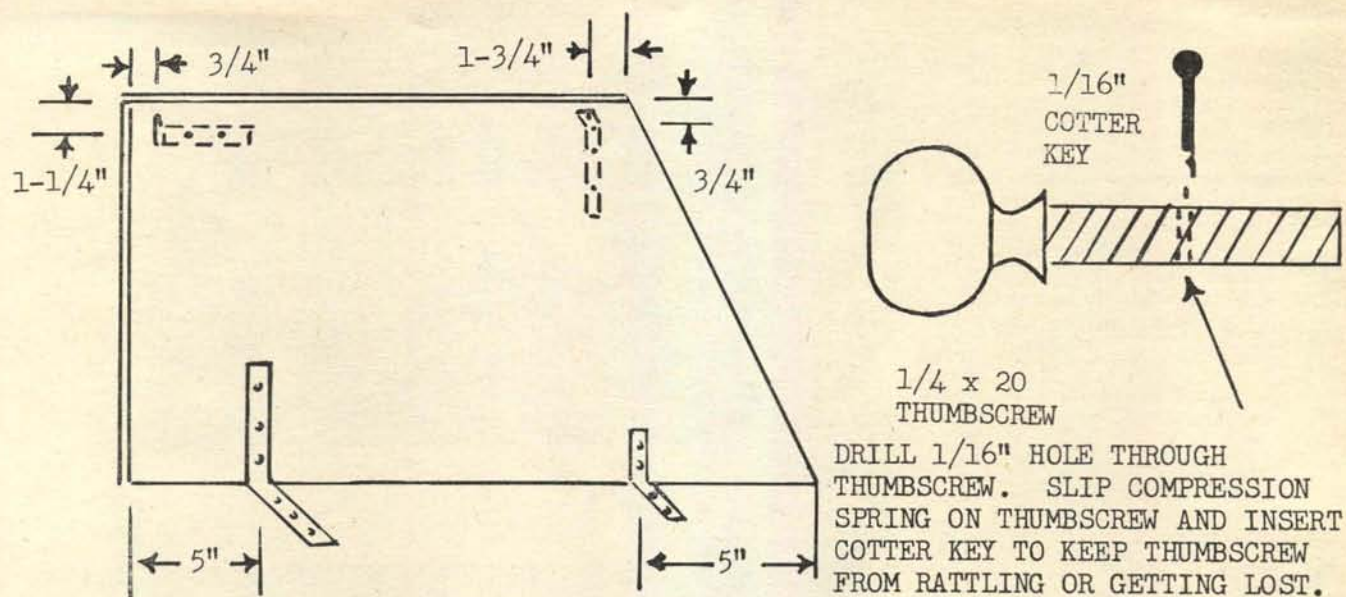


6. BACK AND TOP folded down against floor. In this position, there is still more than an inch left behind the second seat. Note location of the two thumbscrews. Removing two sheet metal screws permits removal of back and top as a unit. Not shown in any of the pictures is a clamp on the outside side of the right-hand end piece. This clamp holds two sizes of screwdrivers and a pair of pliers.

and measure the entire assembly to see that it will fit. When you are sure that everything will work as it should, mark the holes in the angle brackets that are against the floor. Punch a small hole for each mark, and set the ends in place with half-inch sheet-metal screws. Again measure the top and back against the ends to make sure of the fit. Particularly check that the top and back will lie down between the wheel wells. This is a close fit with only $\frac{1}{16}$ " to spare on each end.

The top and back fasten down by use of one sheet-metal screw on each hinge. By proper placement of the hinges, one of the screws that holds the door to the spare-tire compartment is used to attach these hinges to the floor.

WHEN YOU are sure of the fit of all parts, obtain three yards of vinyl sheeting and a pint of white, vinyl glue. Covering the pieces is not very easy, but if you are patient and use reasonable care, it shouldn't take too long. Apply the glue to the vinyl first and then to the wood. If you apply the glue to the wood first, it will be dry before you can cover the vinyl. There are two methods of covering the pieces. Either is satisfactory. The first is to cut pieces of vinyl that are about three inches larger than the piece that is to be covered,

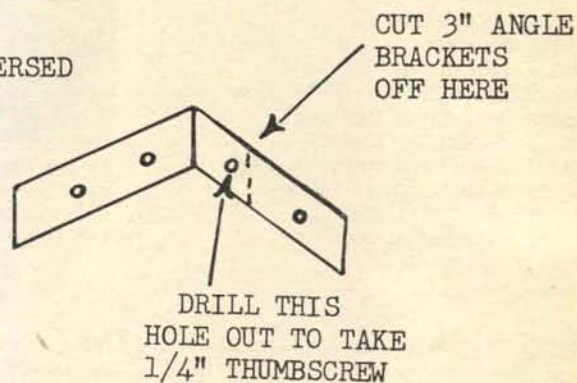


END PIECE SHOWING ANGLE BRACKET LOCATION

LEFT-HAND END SHOWN. RIGHT-HAND END IS REVERSED

FIGURE 3

Details of end piece, thumbscrew modification, and angle-bracket rework.

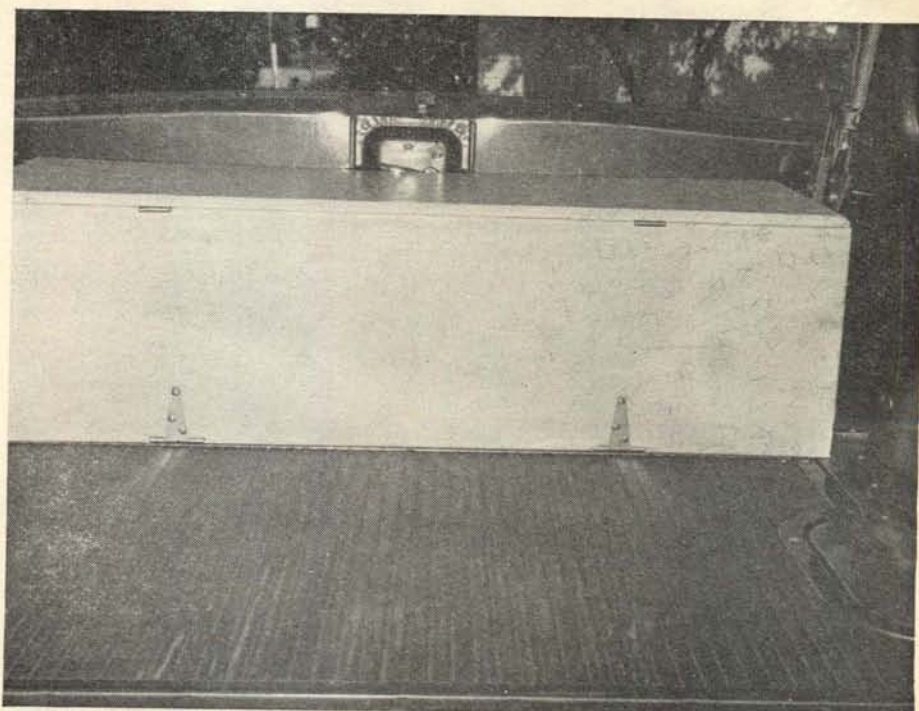


cut notches at the corners, and glue this piece in place. Pull the edges over and hold them in place until they adhere to the other side of the board. Then, cut a piece about $\frac{1}{4}$ " smaller than the uncovered side and glue it in place.

I use a wrap-around method myself. This method uses a piece of vinyl that wraps clear around the piece to be covered and allows a generous overlap. Cut the corner notches, glue the vinyl to one side, and continue right around the other side. This method seems to be easier for me and it has fewer loose edges at any one time. Also, when finished, there is only one edge that can peel up. Have a bit of patience with the vinyl when gluing it down and it will stay permanently and wear very well. Keep brushing the glue over it until the glue seems to wet the vinyl and then it will hold.

After covering the pieces of the trunk, drive four of the rubber-headed tacks into the top and two of them into the top edge of the back. This is to keep the top and back off the floor when the trunk is folded down.

Fold the trunk down when you want to carry large items that are

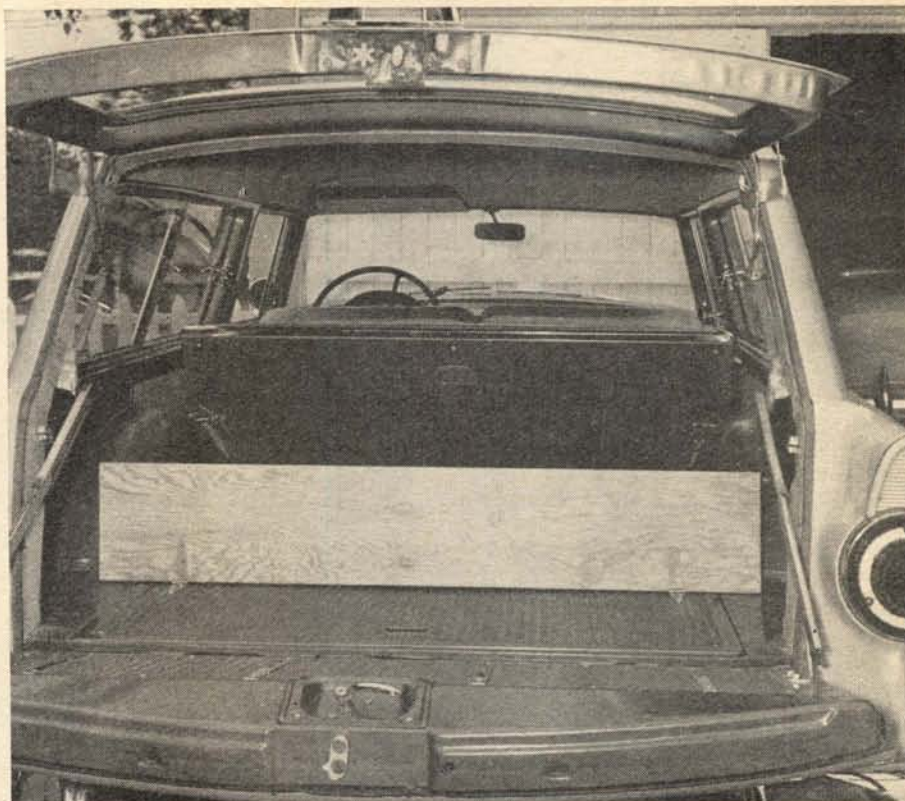


7. COMPLETED TRUNK as viewed from the driver's seat. There are no squeaks or rattles if thumbscrews are set snugly. Lid cannot be raised unless tail gate is dropped. A lock on the tail gate will lock the trunk. NOTE: If children are allowed to use this trunk as a seat, do not open the rear window or they may fall out. Make sure rear door is securely fastened.

not likely to damage the trunk. Otherwise, remove the two screws that hold the back and top in place and remove them from the car for the time being. For larger items, remove the end pieces, too, by removing the five sheet-metal screws on each one. The entire operation takes less than two minutes. On the outside of the right-hand end, I installed a clamp that holds several screwdrivers and a pair of pliers. This is very convenient and the tools do not rattle as they often do if put in the spare-tire compartment.

Here is a Bill of Material for the trunk as I built it.

- 1 pc plywood $\frac{1}{2}$ " by 48" by 48"
(One-half sheet)
- 4 "T" nuts $\frac{1}{4}$ by 20
- 4 Thumbscrews $\frac{1}{4}$ by 20
- 1 pr T hinges, 4" by 2"
- 1 pr strap hinges, 4"
- 4 Angle brackets, 3" (90°)
For thumbscrews
- 2 Angle brackets, 4" (90°) For end
pieces (attaching to floor)
- 2 Angle brackets, 2" (90°) For end
pieces (attaching to floor)
- 10 $\frac{1}{2}$ " Sheet-metal screws
- 34 Machine screws, washers, and nuts
- 3 Yards of sheet vinyl 54" wide
- 1 Pint white, vinyl glue
- 6 Rubber-headed tacks.



8. BEGINNING OF INSTALLATION of a simple divider-type gadget. See Figure 2 for details of metal end pieces. This will provide a very convenient compartment that will keep groceries or tools from sliding around in the car. A snap-on cover or even a hinged lid could be added at very little trouble.

THERE IS very little to explain about the divider-type unit except that the

end pieces, as shown in Figure 2, are made of metal. They fold flat

against the divider when the divider is to be folded down. Ears on the metal end pieces have holes in them that permit screws or nails to be installed through the holes and into the divider so that the end pieces can pivot on them. This would have little mechanical strength in the end of plywood, and so the ends of the metal pieces are bent at right angles. When the ends are swung out into position to hold the divider in place, these angles fit snugly in front of the divider and take the strain against the divider. The end pieces are fastened in place with a single sheet-metal screw in each one.

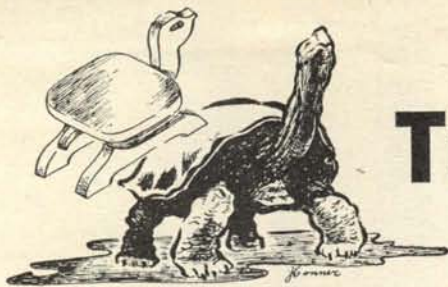
It would not be difficult to add a folding top to this type of unit. Or a snap-on top could be made up quite readily. This unit or the trunk could also be made in much smaller size so that the entire assembly would fit on top of the spare-tire-compartment door. In some cases, this would be more advantageous than the one shown. It would also be possible to install the trunk against the back of the second seat. This would require addition of a door on the trunk.

Incidentally, the hardware has been installed in the pictures just for measuring purposes. It is, of course, removed before covering the pieces with vinyl and the hardware is then replaced.

THE END



9. DIVIDER FOLDED DOWN. End pieces fit under the divider when it is in lowered position. Divider can be removed by removal of six sheet metal screws.



Turtle Stool

for Young TV Viewers

CAROL CONNER

Drawings by John Conner

THRILL THE small fry at your house with a turtle stool to sit on while watching favorite television programs. You can make one easily from 1" white pine boards.

The stool is made of the following pieces:

1. The turtle's back, which forms the seat of the stool.
2. The turtle's head, neck, and

tail, all cut in one piece.

3. Two leg pieces.
4. A brace which goes beneath the seat from one leg piece to another.

Figure 1 shows the shapes and dimensions of these pieces. Draw actual size patterns on paper and transfer them to the wood. An easy way to draw a curve, such as those on the four corners of the seat, is to first draw a right-angled corner, then fit a saucer or bowl into the corner and draw around the edge, thereby rounding the corner smoothly.

Cut the pieces with a coping saw, cutting just outside the line so you will have room for sanding.

Make an eye on each side of the turtle's head with a gouge chisel.

Sand all the pieces smooth and paint them green or any color the youngster at your house especially likes.

To assemble the pieces (Figure 2), you will need six 2" finishing nails and seven 1½" wood screws.

First, attach the head, neck, and tail piece to the bottom of the seat with three wood screws. Drill holes for them through the head, neck, and tail piece and a little way into the bottom of the seat, using a small drill about half the size of the screw shank. Screw in the screws until the heads are flush with the wood on the bottom of the head, neck, and tail piece.

Next, fasten the legs to the seat with 2" finishing nails, three in each leg. Set the nails by *pounding them* below the surface of the wood. Then you can fill the holes with plastic wood and when the stool is given a second coat of paint the holes will be hidden.

The brace to give added strength to the stool comes last. Mark the place where the brace will come against the leg pieces, and drill holes for two screws in each leg. Insert the screws from the outside of the leg pieces into the brace.

Give the stool a second coat of paint, and the T-Viewing Turtle is complete.

THE END

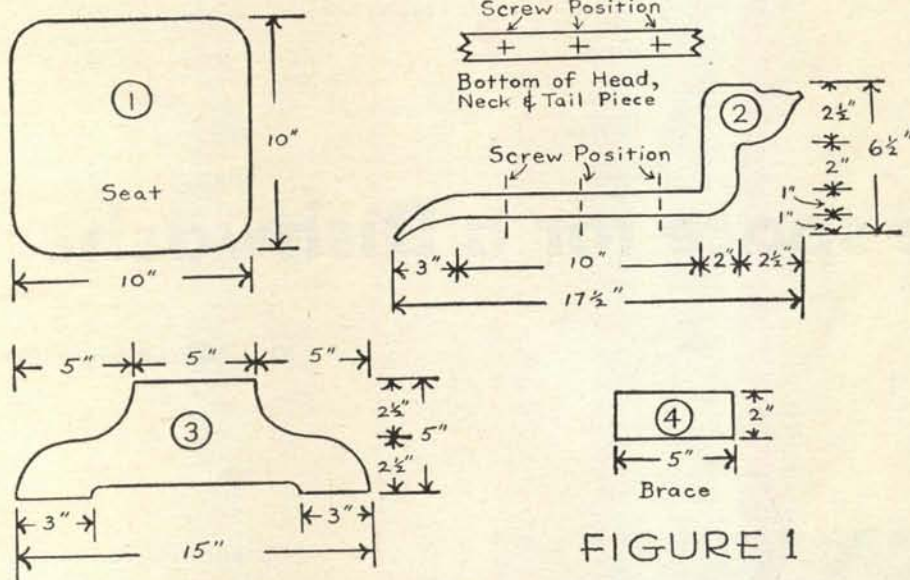


FIGURE 1

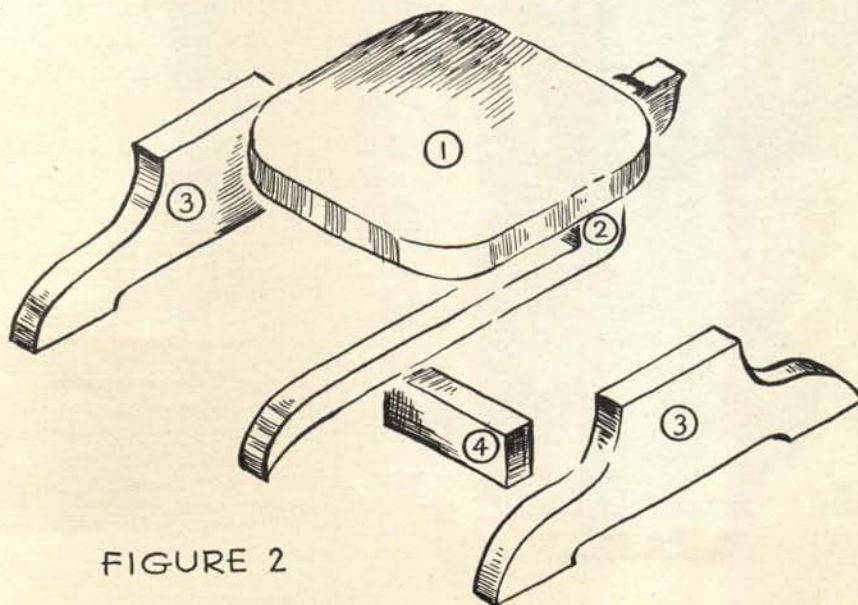
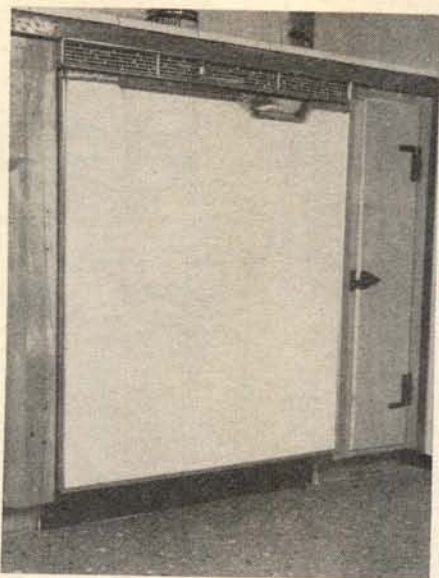


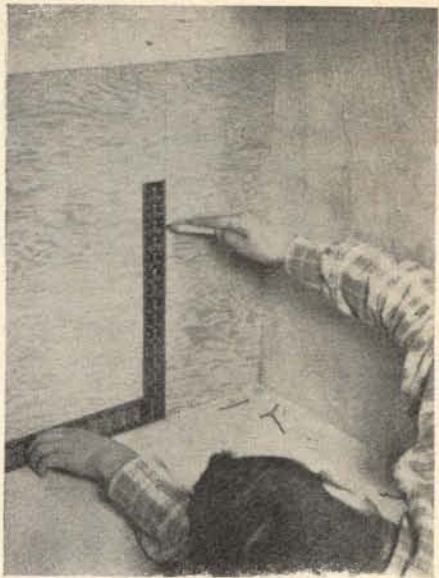
FIGURE 2



PHOTOGRAPH 1—Before: Chances are, the installation area will resemble this or something like it. You'll have to sacrifice some shelf and drawer space. First step is to remove doors, drawers and framing. Save hardware for future use.



PHOTOGRAPH 2—After: Dishwasher fits snugly into recess created for it. If cutting into wall studs is only way you can get front of washer flush with face of cabinets, let it project—but no more than $\frac{1}{2}$ ". Note how leftover space was used.



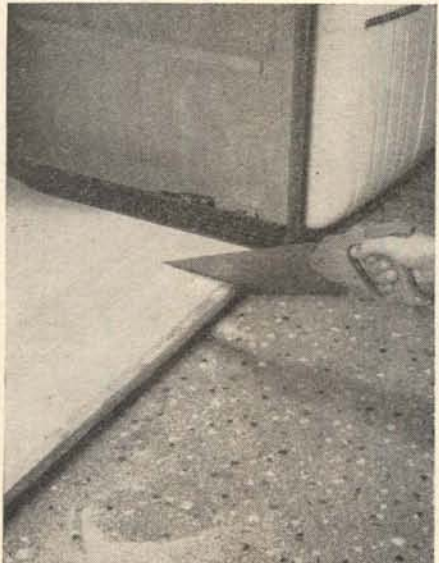
PHOTOGRAPH 3—After removal of framing, mark a line for cutting bottom and back of existing cabinet. Do this carefully, using a square so recess will be same width both back and front. Cut back enough for new side which will be erected. Maybe removed shelf can be used as new side.

Preparing the space for a Dishwasher

R. J. DE CRISTOFORO



PHOTOGRAPH 4—A portable jig saw does a fine job of making the cut. If one is not available, use a keyhole or compass saw. Cut straight, carefully.



PHOTOGRAPH 5—Use a handsaw to make the final cuts down to the floor, and to the underside of the cabinet top.

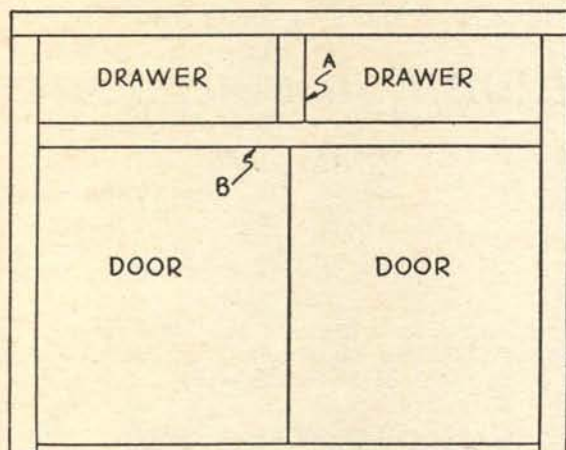
If you are planning to add a mechanical dishwasher to your kitchen, here's how you can do one of the major preliminary steps yourself.

EVEN IF you don't care to do the necessary plumbing involved (and many times it's wise to leave this phase of the operation to experienced help) you can save quite a sum just by preparing the opening needed for the installation of a mechanical dishwasher. This is a job you **can** do, easily and without worry.

Before you start, read the instructions that come with the washer. These will tell you the exact size of the opening needed for the machine; not only its width across the front, but also the depth. Thus you can establish just how much cutting away you have to do, and plan a suitable arrangement for the remaining area.

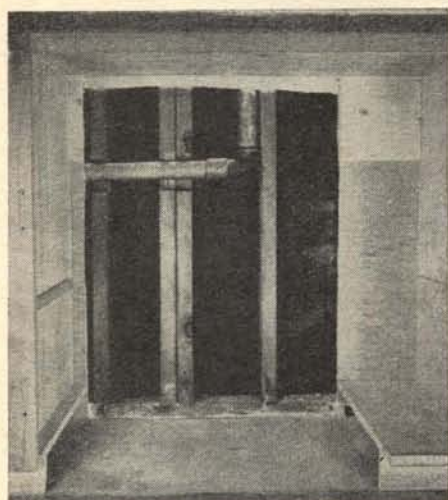
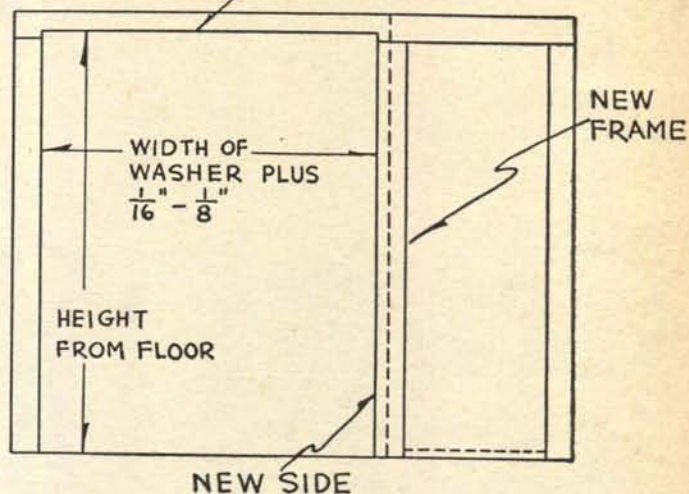
The photographs and the drawing show the steps involved.

FRAME OF EXISTING CABINET



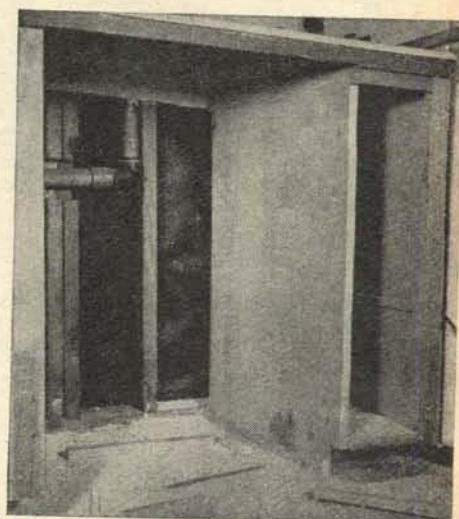
REMOVE DRAWERS, DOORS AND
FRAMES A & B

CUT INTO TOP FRAME FOR
WASHER HEIGHT IF NECESSARY

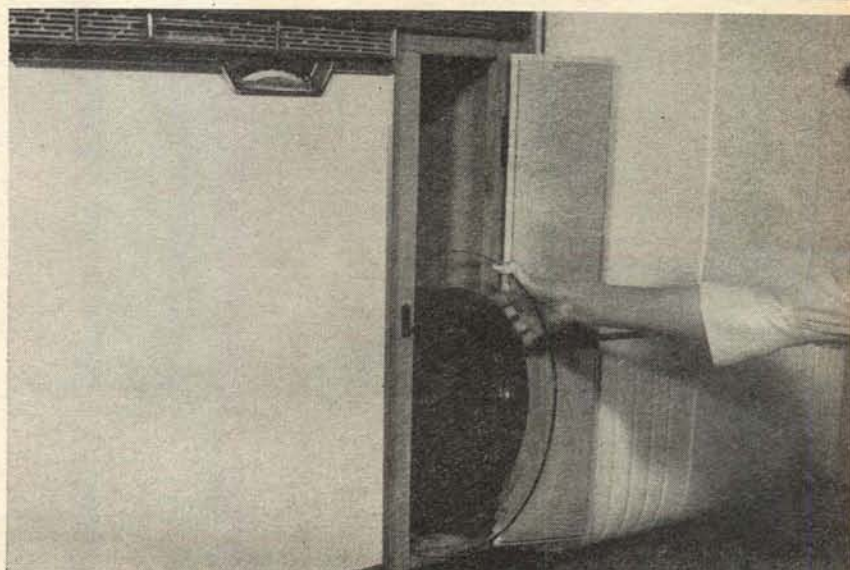


PHOTOGRAPH 6—All cutting done; job ready for "dressing up." Wall covering was removed so electrical connection could be made. Easiest method is to bring new line down from existing outlet above counter. End this in a new box so washer can be plugged in. Pipe in picture is sink vent.

PHOTOGRAPH 7—The old shelf was used to make the new side. Note cutout to match toe space. After this it's a question of cleaning out the area, painting, if desired, and recovering the exposed studs. Careful removal of Gypsum board made it possible to use same piece again as cover.



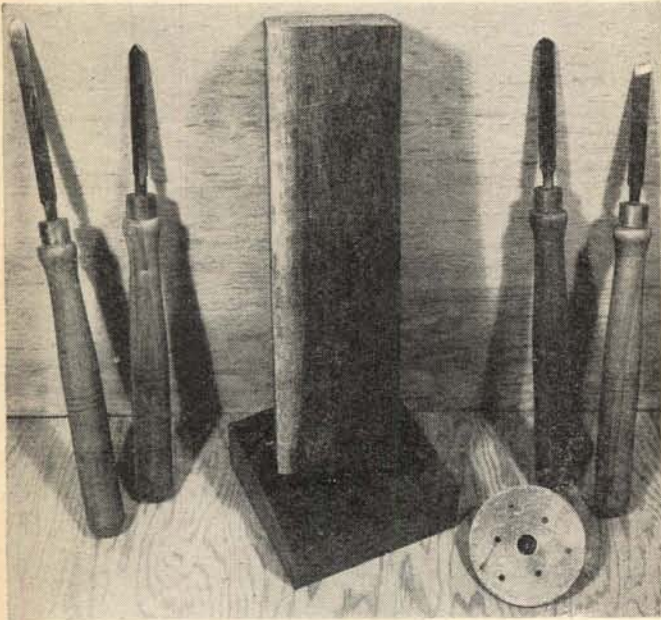
PHOTOGRAPH 8—Job done! New vertical frame piece finishes off new, narrow storage space which is ideal for large trays and similar items. Old hardware was utilized to hang new door.



The End

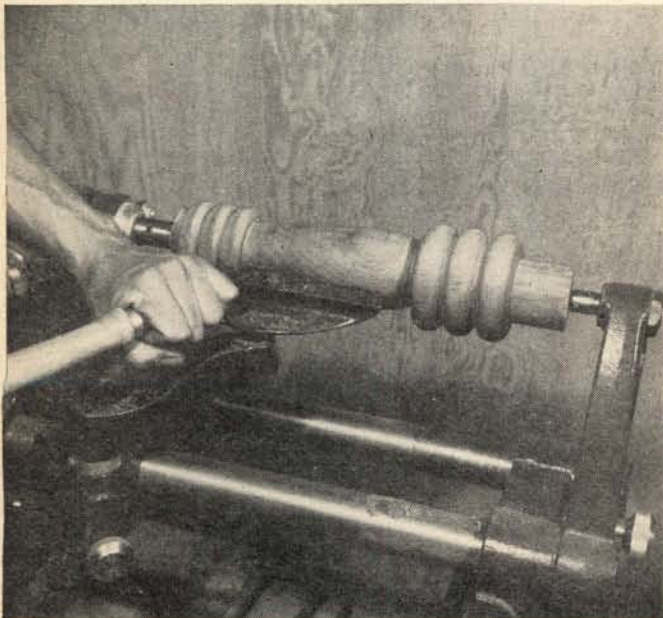
Turn this Lamp on your Lathe

WARREN ASA



TO MAKE a dumbbell table lamp, two pieces of wood are required: 2x6x6 inches for the base, and 3½x3½x14 inches for the body. A 3-, to 5-inch face plate will do. Keep your tools sharp at all times.

TURN THE BODY between centers, forming the fancy dumbbell shown here. Note the plain section on the right which will be glued to the base. Sand until smooth. Use 3/0 sandpaper for final sanding.



IF YOU are looking for a pleasant evening's project with the wood lathe, the dumbbell table lamp, pictured here, will bring you much pleasure. As a useful piece of furniture, it's attractive, too.

Once you have turned out a few one-piece projects, you will find this table lamp a real turning job, involving both center and face plate turning. Almost any wood can be turned, but you will find walnut, maple, birch, oak and basswood especially good. Try your local sawmill for old material. See sketch for complete dimensions.

A ¼-inch hole is drilled through the body of the lamp to take the electrical wiring. If you lack a bit long enough to drill this hole, it can be done in this way: Drill a ¼-inch hole in each end of the lamp, as deep as your bit will allow. To finish the hole, heat a straight No. 9 wire red hot at the end and, using a firm pressure, burn out the wood between the two drilled holes. To heat the wire, use a blowtorch or gasoline camp stove.

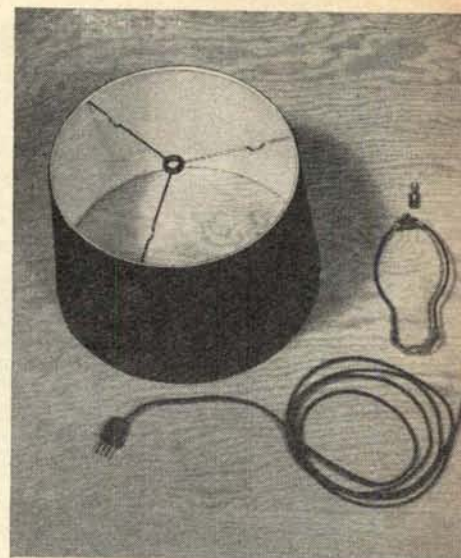
Here are the approximate speeds in r.p.m. which should be used for lamp post turning of this type: roughing, 500; cutting, 800; finishing, 1200.

Fittings may be taken from an old lamp or purchased new. Shade, harp and finial are available at furniture stores, and other fittings at electrical shops, at a total cost of a dollar or two.

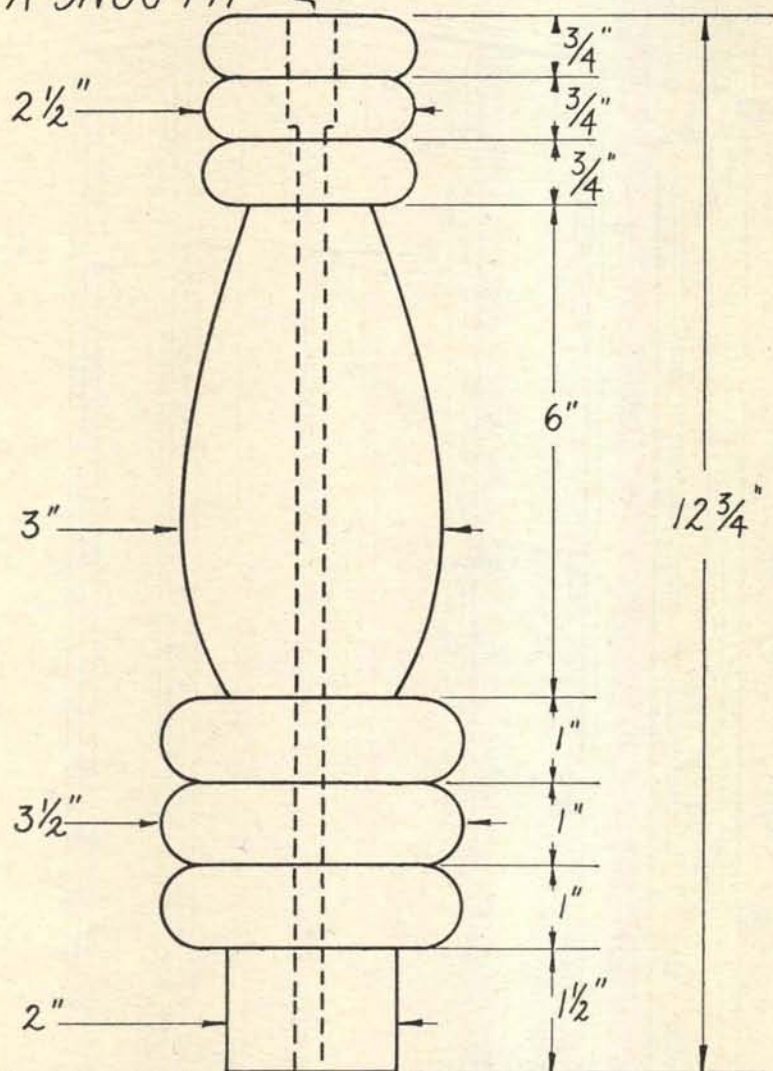
SAW OUT the circular base and mount firmly on face plate. Turn and sand the outside and then turn out the center hole to take the lamp body. The snugness of this joint can be tested while base is still on lathe.



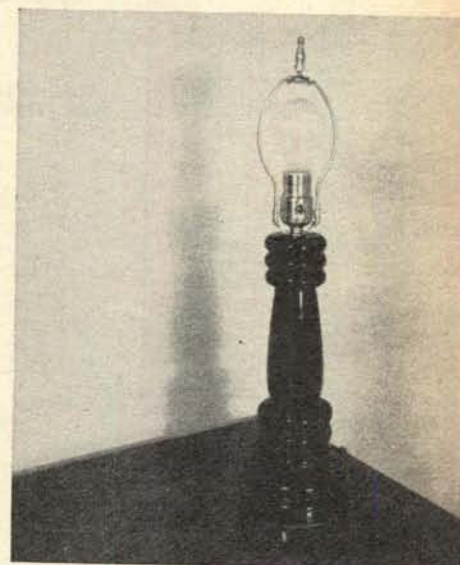
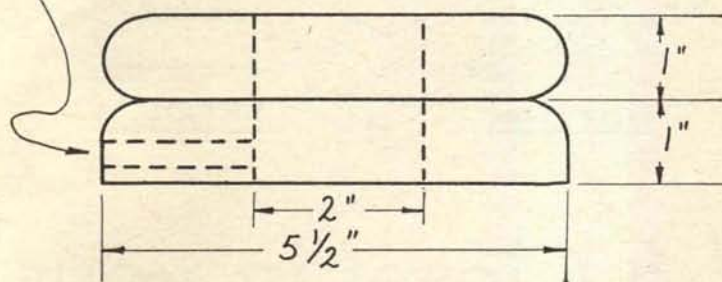
THESE ARE the fittings needed. The piece of $\frac{1}{8}$ -inch threaded pipe can be found at plumbing shops. A push-switch socket, shown here, is favorite for table lamps, with 10 feet of electrical cord attached.



HOLE FOR PIPE
MAKE A SNUG FIT



$\frac{1}{4}$ " HOLES FOR
WIRE



THE COMPLETED LAMP, without shade. Finish with varnish, clear lacquer or linseed oil. Lighter woods can be stained before finishing.



YOUR FINISHED dumbbell lamp is a turning project to be proud of, as shown here with shade.

SLIDING DOOR TRACK

1" X 2"

2" X 2" NOTCHED FOR 1" X 2"

2" X 4" HEADER FOR CLOTHES ROD

7'-0"

2'-6"

3'-0"

1 X 2'S

2" X 4"

MORTISE FOR HINGES

CLOTHES ROD

FILLER BLOCK

1" X 8" TAPERED

1" X 2"

2" BRACE PEG-BOARD

1/4" TEMPERED PRESWOOD

SHELF 1" X 8"

BOARD

BRACE

1 X 2'S

2" X 2"

1/4" TEMPERED PRESWOOD SHELF

TRACK

SLIDING DOOR

DOOR

1" X 8"

NOTCHED 2" X 2"

1 X 2'S

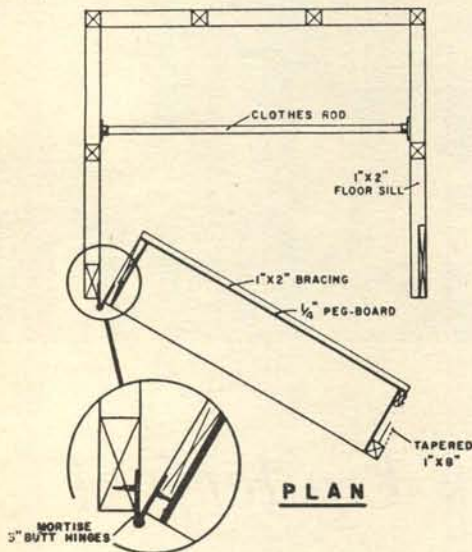
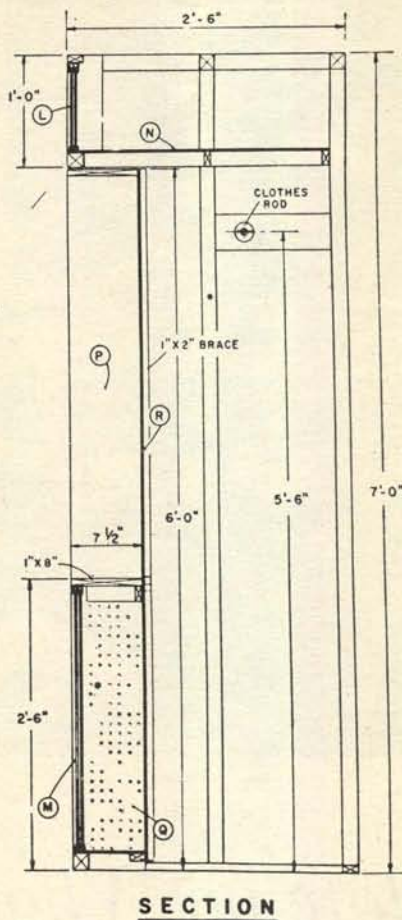
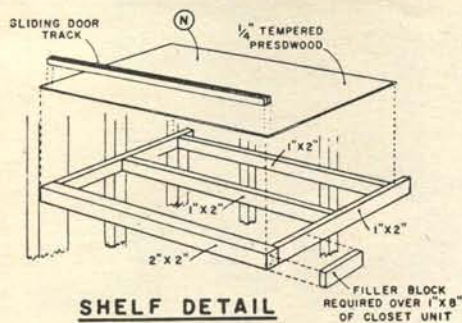
2" X 2"

SEE DETAIL "A"

SHELF FRAME

DETAIL "A"

30 « WORKBENCH



A STORAGE DOOR, separate overhead shelf space, and a spacious area to hang clothes are features of this combination game and guest closet. Sports equipment and pictures hang from Masonite Peg-Board panels on the door. Shelves are enclosed with sliding doors made from ridged hardboard panels.



ANY RECREATION or game room will be improved by the construction of a combination game and guest closet that stands by itself or can become part of a wall storage area. Made of wood framing and Masonite hardboard panels, the closet includes a storage door, spacious area for hanging clothing, and a separate overhead shelf area.

Hardboard pieces for the project are a 3' by 4' panel of Masonite 1/4" Ridgeline, one 4' by 4' and three 4' by 7' panels of 1/4" Tempered Presdwood and a 4' by 6' panel of 1/4" Peg-Board. Framing lumber includes 60 linear feet of 1" by 2" material, 22 feet of 1" by 8", 68 feet of 2" by 2" and a 12-foot 2" by 4".

Dimensions of the usual closet are 3' wide, 2 1/2' deep and 7' high. The height can be altered to match the ceiling height of the room. The interior of the clothing area should be 6' high with a clothes rod located 5 1/2' from the floor.

The separate overhead shelf, with sliding doors of Masonite Ridgeline, takes up the remaining space to the ceiling.

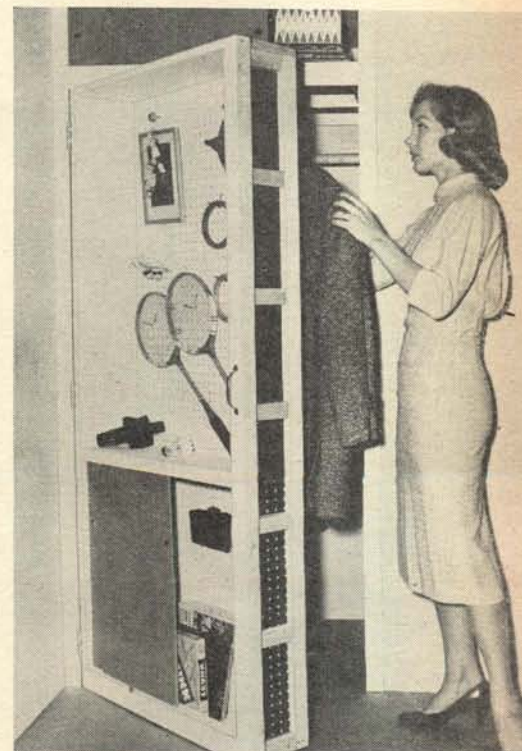
Framing for the closet is composed of a 2" by 4" corner post, 2" by 2" pieces and a 1" by 8" board. Two-by-four headers support the clothes rod. The 2" by 4" corner post should be mortised to accommodate the door hinges.

The storage door is 7 1/2" deep and is built to fit inside the front of the closet. It is backed with perforated hardboard from which may be hung musical instruments, sporting equipment or other items. Framing used includes 1" by 2" and 2" by 2" corner pieces, a 1" by 8" board on one side and 1" by 2" diagonal bracing members on the back.

The lower part of the door is enclosed at the top by a wood shelf and has sliding doors made of Ridgeline. Standard sliding door hardware is used here and on the shelf area at the top of the closet.

If the closet is to stand alone, sides and the back should be paneled with Tempered Presdwood. If it is to become part of a wall storage unit, the side that fits against adjacent sections can be left unpaneled.

The End



CLOSET SPACE is located behind the storage door. There is a clothes rod and floor space for suitcases. Other items may be hung from the back of the Peg-Board panel. The closet stands alone or can become part of a wall storage unit.

HOW TO MAKE the most of a stairway in interior decoration is demonstrated in this living room. The floor, made of smooth, easy-to-clean Excelon vinyl-asbestos tile, features custom-designed "butterfly" insets that carry out the design of the fireplace wall.



Here's a survey of the comparative qualities of some of the smooth surfaced, resilient floor covering materials available to today's householders.

Getting up-to-date on What's Underfoot

Photographs by Armstrong Cork Company



THE USE of smooth surface, resilient flooring materials—once confined almost exclusively to the laying of linoleum on kitchen and bathroom floors—has expanded mightily in recent years, due largely to the many new materials developed. Today there is a type of resilient flooring to meet any need—whether for bathroom, kitchen, basement—any room in the house, in fact.

Smooth surface flooring materials—including linoleum and plastic types in sheet form, and the tile family of asphalt, rubber, plastic, cork and special kinds—offer homeowner and housewife the combined advantages of beauty, convenience and long wear. Some of these flooring materials can be installed by the householder himself, with instructions available from the manufacturer.

LINOLEUM TILE, in a styling that closely resembles inset parquet flooring, helps carry out the decorative theme in this combination family room-dining area. The color and graining of linoleum tile, as with all true linoleum, goes all the way through to the backing. Thus, the floor gives years and years of service with no fading or "wearing off."

The color and design of many, many patterns allows a selection to fit every interior decoration need. Swish-over-lightly cleaning with a dust mop is the only daily care needed for these floors, since they have smooth, lustrous surfaces with no crevices to harbor dirt. Because of their resilience, the floors are comfortable and quiet underfoot.

For all its attractiveness and convenience, resilient flooring is exceptionally durable. Built into every square yard are years and years of wear. If the floor is installed and maintained properly, its clarity of color and sharpness of design will not change significantly during its lifetime.

Smooth surface flooring, either in tile or sheet form, is installed quickly. A few hours is all the time required to give any residential room a gleaming new floor.

OF ALL resilient floors, linoleum is perhaps the best known and most popular. It is available in more than a hundred distinctive patterns. Basically, linoleum consists of a mix of oxidized linseed oil, cork and wood "flour," and pigments, bonded to a felt or burlap backing. The mix gives the flooring characteristics of resilience, beauty, and durability; the backing adds to its strength, foot-comfort and noise-deadening qualities. Linoleum's continuous sheet form makes installation possible with a minimum of seams and joints. In addition, it is grease-resistant, so is

one of the best types of flooring for kitchens.

Printed felt-base floor covering, a "loose-lay" type of rug, should not be confused with true linoleum, which is installed as a permanent floor.

Linoleum can be used on any type of subfloor that is above ground-level. However, it should never be laid over concrete in direct contact with the ground, because the alkaline moisture always present there will deteriorate the flooring.

A second type of sheet, or "seamless," flooring is inlaid vinyl plastic. In this material, as in linoleum, the color and design of the pattern go all the way through to the backing. Printed rugs with a very thin coating of plastic are sometimes advertised as "vinyl plastic floor products." While these serve adequately as temporary, removable floor coverings, they by no means compare in quality or durability with the permanently-installed kind of vinyl sheet goods.

Vinyl sheet flooring of the inlaid type is a high-quality, high-style product for use where appearance is important and a feeling of elegance is desired. It is long wearing, exceptionally smooth, and easy to clean. This greaseproof material has a high resistance to abrasion, and it successfully withstands the harmful effects of hot soapy water, alcohol and alkaline cleansers.

All vinyl flooring in sheet form can be laid on any type of suspended subfloor. And certain kinds—those with

a special moisture-resistant backing, called Hydrocord — can be installed anywhere, even in basements and other below-ground areas.

RECENTLY ANNOUNCED was the development of an air-filled foam underlayment that permits new resilient flooring to be laid over old. Cushion-Eze Underlayment, as this "padding" is called, adds a luxurious springiness to linoleum sheet goods and tile, Corlon vinyl sheet goods and tile, and Linotile, the flooring types with which it is used. When new flooring is installed in an area already surfaced with a smooth surface floor, the air-foam underlayment does away with the time, trouble and expense of ripping up the old flooring. When it's installed over a wooden subfloor, it eliminates the need for a plywood or hardboard base that otherwise should be used for best results. Cushion-Eze Underlayment, thus, both simplifies flooring installation and makes the finished floor much more comfortable and quiet to walk upon.

Resilient tiles are being specified more than ever before, for use throughout the home. Their ease of handling and replacement, coupled with their unlimited design possibilities, has accounted largely for this increased popularity. Tiles in special designs have found a functional as well as decorative use; for they can be laid in such a way as to make the floor, and thus the room, appear larger.



WHEN THIS BEDROOM was remodeled, its decorative elements were grouped about the cheerful old fireplace. On the floor, a "seamless" sheet flooring of Corlon vinyl plastic helps ensure that the room will be easy to keep spotless. The mosaic-like design is one of many effects available in plastic flooring.



THIS "HIS 'N' HERS" BATHROOM, with separate facilities for man and wife, suggests a means of maintaining privacy without sacrificing convenience. Shower curtains can be drawn to separate the two areas of the room. Spilled things wipe up easily from the rubber tile floor, because its extra-smooth surface has no dirt-catching crevices.

Asphalt tile is completely resistant to the moisture and alkali found with grade-level and below-grade floors. This, coupled with its low cost, makes it especially popular for use in basementless homes. Made in a wide variety of patterns, with a number of precut decorative insets also available, asphalt tile is one of the least expensive of all flooring materials. It is not, however, grease-resistant; and asphalt tile is not quite as easy to maintain as other floors.

Another type of flooring that can safely be installed in any area of the home, from attic to cellar, is vinyl-asbestos tile. **Smooth, colorful and fire-retardant, vinyl-asbestos floors are favorites for do-it-yourself installation. Some types are made especially for home mechanics, in fact; these tiles can be cut with**

ordinary scissors, and the flooring adhesive spread with a paintbrush. So laying the floor, even fitting tiles at room edges, is quick and easy.

Rubber tile has a smooth, plate-like surface and a smart richness of color. This durable material is reinforced for greater wear and a high rate of recovery from indentation. Its surface will not crack or craze. Rubber tile's ability to cushion footsteps and to reduce noise that results from impact with the floor makes it especially suitable for use in bedrooms and other areas where quiet and comfort are important. Through development of a special adhesive, this luxurious floor may now be specified for installation in basements, as well as on suspended and grade-level subfloors.

Plastic tile, if it is a high-quality

vinyl product, is a flooring recommended for all types of interiors. A lustrous, stain-resistant flooring, it is available in a broad range of pattern effects, both bold and subdued. When installed with a waterproof adhesive, vinyl plastic tile can beautify even areas of the home below-grade level.

FOR ROOMS in which the homeowner desires a feeling of quiet dignity, cork tile is an excellent choice. Its mellow, natural cork colors add splendor to dens, music rooms and bedrooms, with an underfoot comfort and noiselessness that is unsurpassed. Cork tile may be laid on any suspended subfloor, and under certain conditions on a concrete slab in contact with the ground. It is not recommended for use below-ground

CHARACTERISTICS OF SMOOTH-SURFACE FLOORING MATERIALS

	WHERE TO USE	UNDERFOOT COMFORT	GREASE RESISTANCE	ALKALI RESISTANCE	DURABILITY	EASE OF MAINTENANCE
SHEET FLOORING--						
Linoleum	Suspended (above ground level)	Good	Excellent	Poor	Good	Excellent
Vinyl plastic	Suspended (if Hydro-cord backed, use anywhere)	Good	Excellent	Excellent	Excellent	Excellent
TILE FLOORING--						
Asphalt tile	Anywhere	Least comfortable	Poor to fair	Excellent	Excellent	Good
Linoleum tile	Suspended	Good	Excellent	Poor	Good	Excellent
Vinyl-asbestos tile	Anywhere	Fair	Excellent	Excellent	Superior	Superior
Linotile	Suspended	Good	Excellent	Poor	Superior	Superior
Cork tile	Suspended (and in some cases, on grade)	Superior	Fair	Fair	Good	Fair
Rubber tile	Anywhere	Excellent	Good	Good	Good	Good
"Solid" vinyl tile	Anywhere	Excellent	Superior	Excellent	Superior	Superior
Vinyl cork tile	Suspended (and in some cases, on grade)	Excellent	Excellent	Good	Good	Superior

Resilient flooring products are available today in a wide variety of types to fit any flooring need. To help the homeowner determine which type will best suit his own requirements, Armstrong Cork Company offers this table, summarizing characteristics. The flooring types are separated here into the two basic kinds—sheet goods and tile—then listed in order of typical cost, least expensive types first.

level, or in any area where excessive dirt or foot-traffic will mar its surface.

One of the newest kinds of flooring is vinyl-cork tile. It consists of cork base onto which a layer of pure, clear vinyl plastic is fused as a wearing surface. Vinyl cork tile, therefore, combines the warm, natural beauty of cork and the durability and easy care requirements of plastic. Regarded as a luxury flooring, it is recommended for use in any above-grade area of the house; also, it may be installed on grade-level subflooring, where adequate drainage exists.

Linoleum tile is made from linoleum sheet goods, cut in squares to facilitate handling and installation.

Linotile is a type of flooring that was developed especially for resistance to abrasion and indentation. It is not identical to linoleum cut into blocks. Linotile is a much tougher, more durable material, thanks to different manufacturing techniques and a special "aging" process. Designed for extra-long wear even in the most heavily-trafficked areas of the home, it may be installed over all types of suspended subfloors. Linotile is not, however, recommended for use in basements or on concrete in direct contact with the ground.

TO GIVE specific figures for the cost of resilient flooring materials is virtually impossible, because local costs of labor and materials vary. Generally speaking, asphalt tile in dark colors is lowest cost of all smooth-surface flooring. Next in line is linoleum tile and lighter colorings in asphalt tile. Going up the price scale, vinyl-asbestos tile, linoleum sheet goods, plastic sheet goods, Linotile, cork tile, rubber tile and "solid" vinyl tile follow in that order, with vinyl-cork tile in the highest bracket.

At one time, asphalt tile was the only type of flooring suitable for installation in basements and other below-grade areas. Today, it should be noted, the basement recreation room can be as "dressed up" as any room in the house, with vinyl-asbestos tile, rubber tile, "solid" vinyl tile, or Hydrocord-backed vinyl plastic sheet flooring.

Before choosing a resilient floor, the homeowner should remember that there is a right flooring material for every application. He'll do well to study his own flooring needs, then consult a flooring dealer for help in choosing the floor that will give the most for his money. This consideration, before installation, will give him extra dividends in flooring appearance and in continued satisfaction through the years.

THE END

STATEMENT REQUIRED BY THE ACT OF AUGUST, 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT AND CIRCULATION OF WORKBENCH Magazine published bimonthly at Kansas City, Mo., for January-February, 1959.

1. The names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, John E. Tillotson II, 543 Westport Rd., Kansas City 11, Mo. Editor, Theodore M. O'Leary, 543 Westport Rd., Kansas City 11, Mo. Managing editor, none. Business manager, none.

2. The owner is: Modern Handcraft, Inc., 543 Westport Rd., Kansas City 11, Mo.; John E. Tillotson, II, 543 Westport Rd., Kansas City 11, Mo.; John E. Tillotson, 543 Westport Rd., Kansas City 11, Mo.; C. S. Tillotson, 543 Westport Rd., Kansas City 11, Mo.; Theodore M. O'Leary, 543 Westport Rd., Kansas City 11, Mo.; Mary Ida Sullivan, 543 Westport Rd., Kansas City 11, Mo.; Wilburn L. Mead, 543 Westport Rd., Kansas City 11, Mo.; C. R. Tillotson, 543 Westport Rd., Kansas City 11, Mo.; Lee Gingery, 543 Westport Rd., Kansas City 11, Mo.; Sarah Peery, 543 Westport Rd., Kansas City 11, Mo.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

John E. Tillotson II

Sworn to and subscribed before me this 22nd day of September, 1958 — Dorothy Repass, Notary Public, Jackson County, Missouri. (My commission expires June 13, 1959.)

How to Enlarge Squared Patterns and Designs

Number the outside squares of the pattern both horizontally and vertically. Now, using a piece of paper (preferably tracing paper) sufficiently large for the full-sized pattern, measure off the exact area you wish the pattern to occupy. Divide this area into the same number of squares as appears in the smaller pattern. Number the outside squares on the paper in the same manner as you have numbered the original pattern.

Copy carefully into each of the large squares the portion of the design that appears in each correspondingly numbered square of the original pattern.

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Beer-Grained "Planks"

TOM PARSONS

Even the W.C.T.U. should agree that this is a good use to make of beer.

WHEN YOU'RE stuck with a beer budget to finance a champagne taste, one solution is to put the beer to work, literally. We put stale beer on the walls of our basement den and got a realistic grained plank effect.

We wanted something snootier than knotty pine, but less expensive. We got both. We got richly grained "planks" for less than six cents per square foot. The "planks" are Sheetrock which we bought at five cents a square foot and grained with stale beer and dry colors for less than a penny per square foot. The graining was an easier job than we expected, and the whole effect pleases us far more than would knotty pine Sheetrock, which sells for at least nine cents per square foot in our area.

Four steps, all easy for the amateur painter, turn the Sheetrock into planking. After your Sheetrock is up and the joints taped and spackled, you size the Sheetrock, apply a paint base, add the graining compound,

and finally you varnish. Here is what you will need:

Wall size, 1 pkg.

White paint, flat or semigloss

1 bottle of beer, opened previous day

Burnt umber, 1 pound powdered

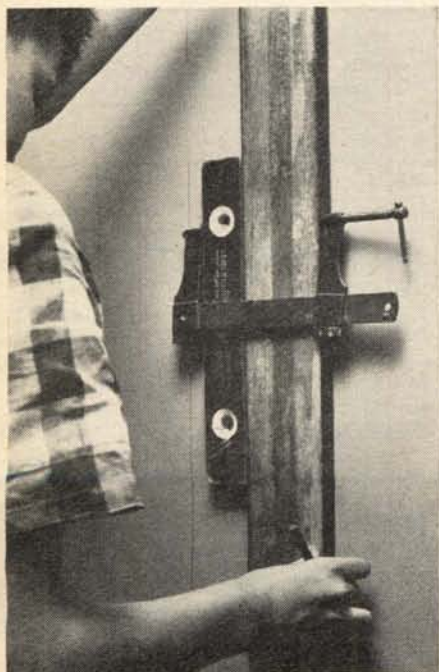
Raw sienna, 1 pound powdered

If you are skeptical about using beer, you can substitute mineral spirits and use oil colors instead of the beer and powdered colors. You will find, however, that it takes more patience and effort to control your grain, as the mineral spirits run more freely than the stale beer. The runniness may make it necessary for you to repeat many of the graining strokes.

It takes less effort to apply one coat of size than two undercoats of paint. When you buy it, ask for wall size or glue size. Instructions for mixing are on the package and one pound will make three gallons of fluid size, enough to cover the walls of a ballroom.

Allow the size to dry at least twelve hours, preferably twenty-four, before applying the base paint. Mix some raw sienna into the white paint and stir thoroughly; this should give you a yellowish tint. Now mix in the burnt umber slowly until your paint turns a light coffee or mocha color. The color of the paint looks appalling going on the wall, and worse when dry, but the third step, the graining, brings about a considerable improvement.

AFTER THE base paint dries, lay out your planks by drawing vertical lines with a soft (No. 2) pencil. We varied the widths of our planks at 4½", 6", and 7½", and made no attempt at an orderly sequence. You can use a plumb bob to get your lines straight, or clamp a spirit level to a straight edge (Photograph 1). The latter method we found was the easier. The pencil line creates the effect of the joint where two planks meet, and



PHOTOGRAPH 1—Clamp a spirit level to a straight edge for drawing in the "plank" lines. A plumb bob may also be used.



PHOTOGRAPH 2—To get the close grained effect, hold the brush almost flat against the wall and draw it down in a continuous stroke.



PHOTOGRAPH 3—A handful of broadcloth is all you need to create the soft grain "stumpwood" or "rotary cut" effect.

the graining compound meeting at the pencil line furthers the illusion of separate planks.

For your graining compound, pour about two inches of your fluid (beer or mineral spirits) into a coffee can, and add enough burnt umber and raw sienna to give it the color of dark brown leather. Mix thoroughly, then do not mix it again while working unless you wish to darken the grain.

You use two implements for applying different grains, a paintbrush and a remnant of broadcloth. The brush gives you the closely lined grain known as "quartered" or "quarter cut," while the broadcloth gives you the wide or softer grain known as "rotary cut" or "stumpwood" effect. You will find the job goes easier and neater if you apply close grain to one plank, slanting in one direction, skip the second plank and close grain the third, slanting in the opposite direction. Now go back to plank number two and either close grain it more or less straight up and down or soft grain it. Don't get rattled if some of your slant graining from planks one and three overlaps into plank two. When you proceed to grain plank two, the graining compound will become fluid enough to be reworked.

Start all varieties of grain by putting the compound on the plank with your brush. Dip the brush just $\frac{1}{4}$ " into the compound and brush it on the plank with up and down strokes. Cover one entire plank. If you need more than one dip for any plank, be sure to dip your brush no deeper than $\frac{1}{4}$ inch or less.

FOR CLOSE grain: After you have covered the plank with the compound place the dry brush flat against the wall (Photograph 2), getting as much of the side of the brush as possible to touch the surface. Now draw the brush down at the slant you want, making occasional swirls to simulate knots and whorls in the wood. If not satisfied with your first pattern, go over it immediately. Though the grain may seem tacky, there is enough moisture in your brush to make the compound remain workable. You will require two or more strokes, side by side, to fill out each plank. Don't hesitate to overlap your strokes. As long as you match your pattern to a reasonable degree you will find the overlaps add to the effect of natural wood.

Maintaining your pattern to the bottom of the plank is not difficult. Carry the downward stroke as far as you can. Next, start a stroke up from the bottom, overlap the end of your downward stroke, then continue your upward motion, gradually lifting the brush off the wall. This "follow through" stroke will help you avoid a sharp, unnatural break between the upward and downward strokes.

FOR STUMPWOOD: After you apply the compound with your brush, bunch up the broadcloth in your hand (Photograph 3) and with the fingers touching the wall lightly, work your hand down the plank in zigzag patterns. Here again, if not happy with the first pattern, try again immediately. However, your pattern usually turns out more realistic when dry than it

seems immediately after you have applied it.

If you plan to manufacture some dark knots you will get better results if you keep a smaller brush handy. Dip it to the bottom of the compound before you start graining, then lay it out to dry for at least an hour before you use it. Let the grain on the plank get tacky, then place the tip of the brush squarely on it (Photograph 4) and rotate the handle until you get a knot pattern.

For a swatch of darker wood or a rosin streak effect, use your regular brush. Here again, wait until the grain on the plank has become tacky then place the tip of the brush squarely against the wall. Move the brush downward, lifting it occasionally.

Allow your graining to dry for at least forty-eight hours before varnishing. Be sure to shade any windows during periods of bright sunlight or your grain may fade slightly before you get it varnished.

To get the exact shade and grain you want, test your ingredients and technique on a scrap of Sheetrock or on an area which you know will be completely hidden from view. Base paint it and let it dry overnight, then apply the graining compound. If not satisfied with the result you have two vehicles to alter—the base and the graining compound.

The only part of our job that didn't offer an easy solution is how to get the youngsters (Photograph 5) back to doing homework in their own rooms. We've been evicted! **THE END**



PHOTOGRAPH 4—Knots or rosin streaks are simulated by jabbing the edge of an almost dry brush against the graining compound when it is tacky.



PHOTOGRAPH 5—Here's a section of the completed wall. It's so handsome that the youngsters want to use the room for their homework.

A Knife Rack with an Antique Look

ROBERTA FAIRALL

The Early American air of this knife rack in no way affects its convenience as a kitchen accessory.

THE BEST place to keep those sharp knives is in an enclosed rack within easy reach of the work area. Here is one with a revolving door which turns seven sharp kitchen knives around ready for use in a flash. The shelf holds salt and pepper shakers, and two hooks keep pot holders handy.

You can make it from 5 feet of 1" x 8" knotty pine solid stock—if possible select pieces with tiny "birds-eye" knots for door and sides—two ¼" dowel pegs, scraps of leather and a pair of cup hooks. Just follow these assembly steps:

1. Draw full-size patterns on paper for the contour parts of back and sides. Lay out a pattern for the knife holder, E, using a compass (Figure 1). Trace around patterns on the lumber, and lay out other members to sizes given in the materials list. Allow space for saw cuts between pieces. Lengthwise dimensions may be altered if the holder is to accommodate any exceptionally long knife.

2. With layouts completed, saw pieces to shape, and true them up to required size. Mark positions of joining members on the wood. Bore for screws and dowel axles (Figure 2), and remember that they are to be force fit in top and bottom, but that the door must revolve freely over the dowels. Be sure holes are bored accurately so the door will swing around to a perfect fit either open or closed. A 1/16" clearance has been allowed all around.

RACK KEEPS KNIVES SEPARATED in an orderly fashion and under cover when not in use. It also provides a small extra shelf and a place to hang pot holders.

3. Begin assembly by joining sides to top and bottom. Use screws and glue on all joints and countersink the screw heads deeply. Next, join back to sides and bottom. Couple the two pieces of the knife holder to make one thick block; cut the slots, and join the door to it. Round off edges with sandpaper.

4. Now, all that remains is to hang the door. First, chamfer ends of dowel axles and drive them through top and bottom into the door. Use washers between door and box. Finally, glue scraps of leather to sides. These act as friction catches. Position cup hooks at bottom of back section, A, for pot holders.

5. Cover screw heads with wood filler. Round off all edges generously to give a well-worn appearance, and sand smooth. Emphasize grain and knot pattern with a light stain; follow with two coats of spar varnish. Remember to sand lightly with 8/0 garnet paper between coats, and to remove all dust before applying more varnish. Tone down the luster of the final coat with No. 4/0 steel wool rubbed with the grain. Bring up a soft sheen with a couple of coats of paste wax.

6. Mount your holder on the wall over a studding with round head brass screws turned in at top and bottom.

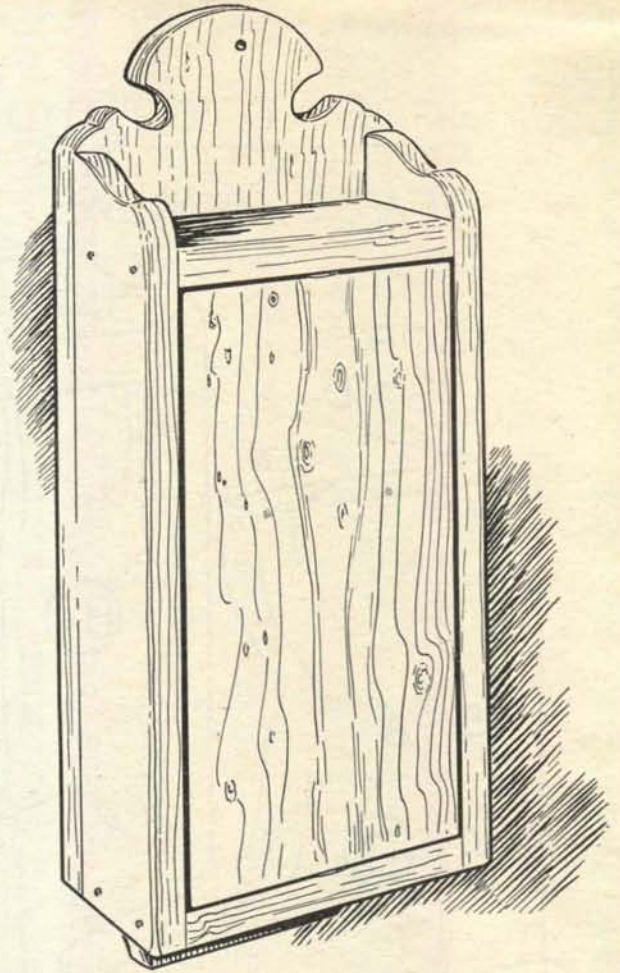
MATERIALS LIST

The rack cuts from 5 lineal feet of 1" x 8" ($\frac{3}{4}$ " x $7\frac{1}{2}$ ") surfaced knotty pine solid stock as follows:

Item No.	Rqd.	Description	Size
A	1	Back	$\frac{3}{4}$ " x $7\frac{1}{2}$ " x $19\frac{3}{4}$ "
B	2	Sides	$\frac{3}{4}$ " x $3\frac{1}{2}$ " x $15\frac{1}{4}$ "
C	2	Top and Bottom	$\frac{3}{4}$ " x $3\frac{1}{2}$ " x 6"
D	1	Revolving Door	$\frac{3}{4}$ " x $5\frac{7}{8}$ " x $12\frac{7}{8}$ "
E	2	Knife Holder	$\frac{3}{4}$ " x $2\frac{1}{4}$ " x $5\frac{7}{8}$ "

Miscellaneous:

- 2 $\frac{1}{4}$ " dowel pins $1\frac{1}{2}$ " long.
- 12 No. 8— $1\frac{3}{4}$ " f.h. wood screws.
- 2 No. 8— $1\frac{1}{4}$ " f.h. wood screws for (E).
- 2 Round head brass screws for hanging.
- White liquid resin glue.
- Wood filler and scrap of leather $\frac{1}{16}$ " thick.



WHERE FOOD IS PREPARED, this knife rack comes in handy and makes an attractive wall ornament.

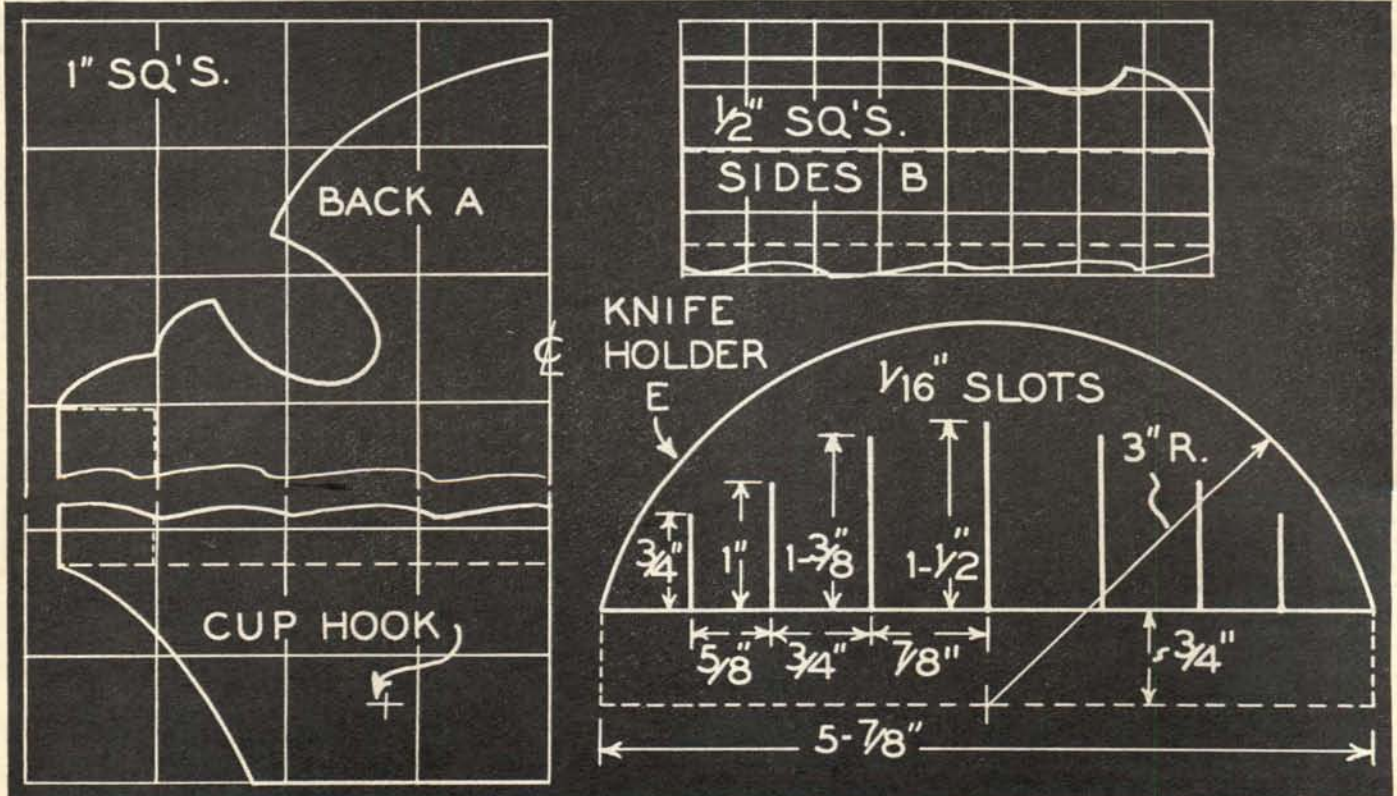


FIGURE 1—Layout of knife holder and pattern for curved portions of back and sides. See page 35 for directions on How to Enlarge Squared Patterns and Designs.

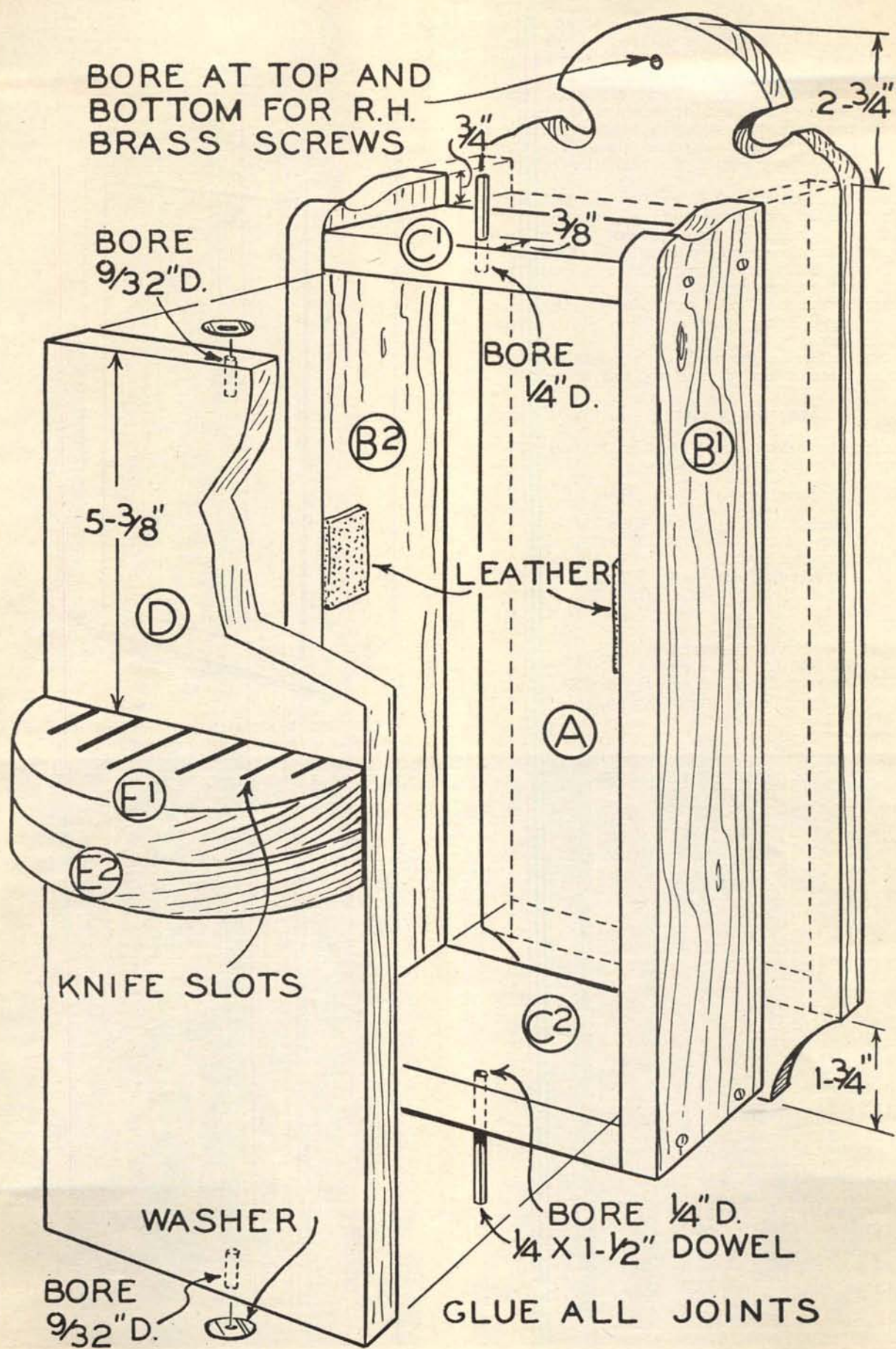


FIGURE 2—Assembly details for knife rack.

Repairing Plastic Chair Seats

HUGH F. WILLIAMSON

ALL TOO commonly plastic chair seats are cut or torn accidentally. Unless repaired these tears prove very unsightly and increase in size with daily use. Such tears can be quickly repaired with ordinary tools, plastic material for patching and latex contact cement.

First, remove the seat from the chair frame and place it upside down on some protective covering. Remove the staples or tacks on the undersurface on the three edges closest to the tear. With care reverse the plastic upholstery back upon itself until the tear is clearly exposed. Now cut a piece of similar plastic upholstery material for a patch. The patch should extend at least 2 inches in all directions beyond the tear and should be placed face up on the seat padding in the proper position to be centered under the tear when the upholstery is folded back in the proper position.

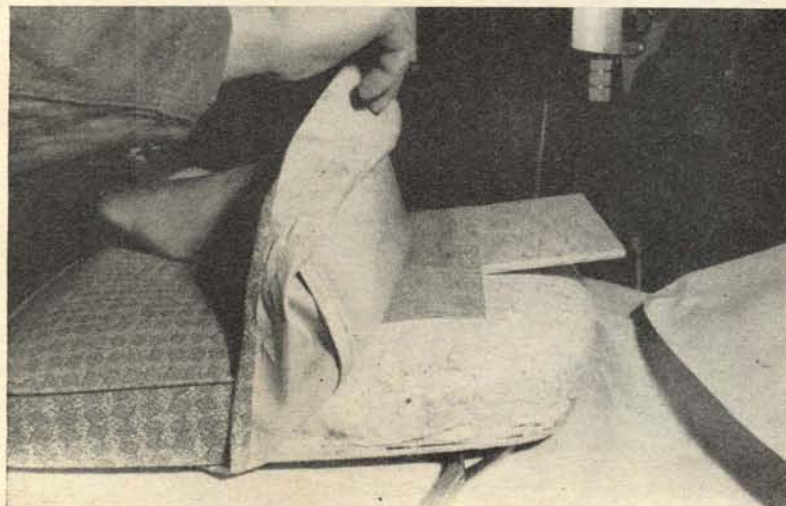
With a piece of newspaper placed

beneath the tear apply a coating of contact cement to the undersurface of the original plastic upholstery covering the area for at least 2 inches from the tear in all directions (Photograph 1). Coat the surface of the patch for an equal area. Allow the cement to dry according to instructions. Slip a scrap piece of plywood beneath the patch to form a solid working surface and slowly bring the upholstery material back over the patch (Photograph 2). Take special care in proper alignment of the tear as the cement bonds on contact and it is difficult to alter position. Using your hand or a roller make certain of good glue contact in all areas of the patch before removing the plywood scrap.

Pull the upholstery down over the edge of the seat and tack or staple under tension to remove any wrinkles. Allow the cement to set for at least 24 hours before placing the chair back in full duty.



PHOTOGRAPH 1—Paint contact cement on undersurface of tear and surface of the patch.



PHOTOGRAPH 2—Fold back the upholstery over the patch rubbing firmly to make a good contact.

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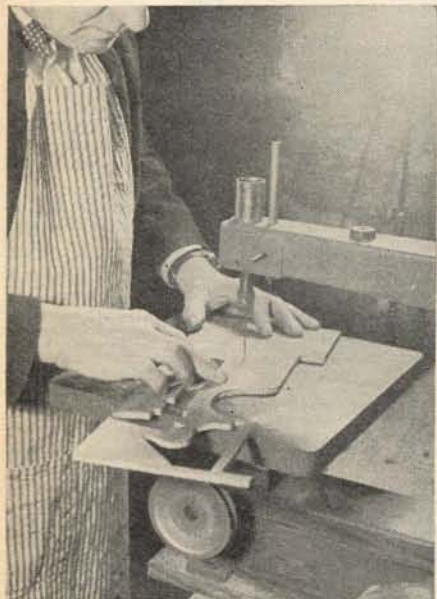
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Here is a simple way for you to achieve that ideal of workshop orderliness, a place for everything and

Everything in its Place

WEBSTER P. TAYLOR



PHOTOGRAPH 1—Cutting out the tool outlines on the jig saw provides a space for each tool. This same method can be used for pliers, lathe calipers or other small tools.



PHOTOGRAPH 2—With the plywood in place, each tool has its own recess and does not slip or slide around when the drawer is opened or closed.



PHOTOGRAPH 3—By providing rests or recesses for drills and auger bits, the size wanted can be picked out without having to paw through a lot of tools.

AN AXIOM that has been used successfully in industry for years and can be applied to the home workshop with equal success is "A place for everything and everything in its place." One of the most aggravating features of many home workshops is the catch-all way in which small tools are stored when not in use so that when wanted they must be searched for through piles of other tools.

A very simple and easy solution to this problem is to build into tool chest or workbench drawers individual tool holders which keep each tool in its own place and make each one readily accessible when wanted.

This is particularly advisable for small tools and precision measuring instruments. In the case of the latter a piece of $\frac{1}{4}$ " plywood is cut the length and width of the inside of the drawer. The tools are then arranged on the plywood in such a way as to make the most efficient use of the available space. The outline of each tool is drawn in pencil on the plywood. These outlines are then cut out with a jig saw (Photograph 1). The plywood now contains an opening for each of the tools. The back

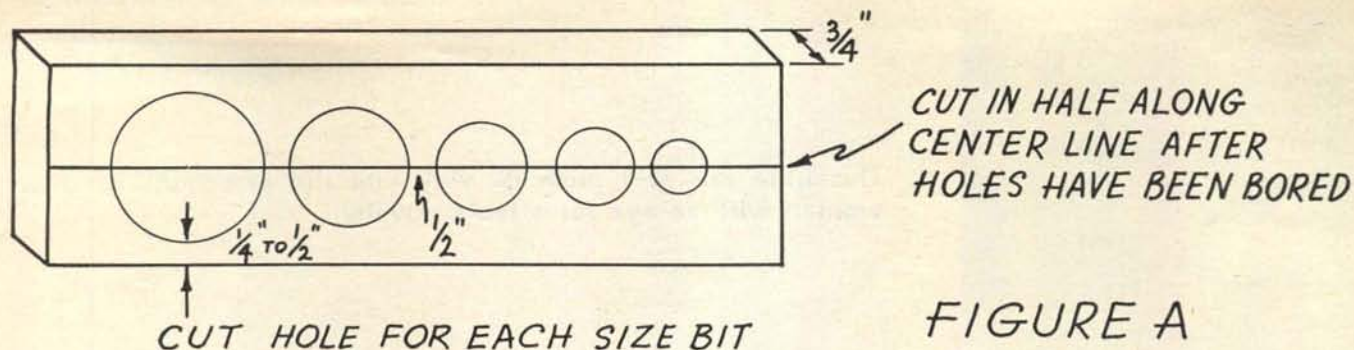


FIGURE A

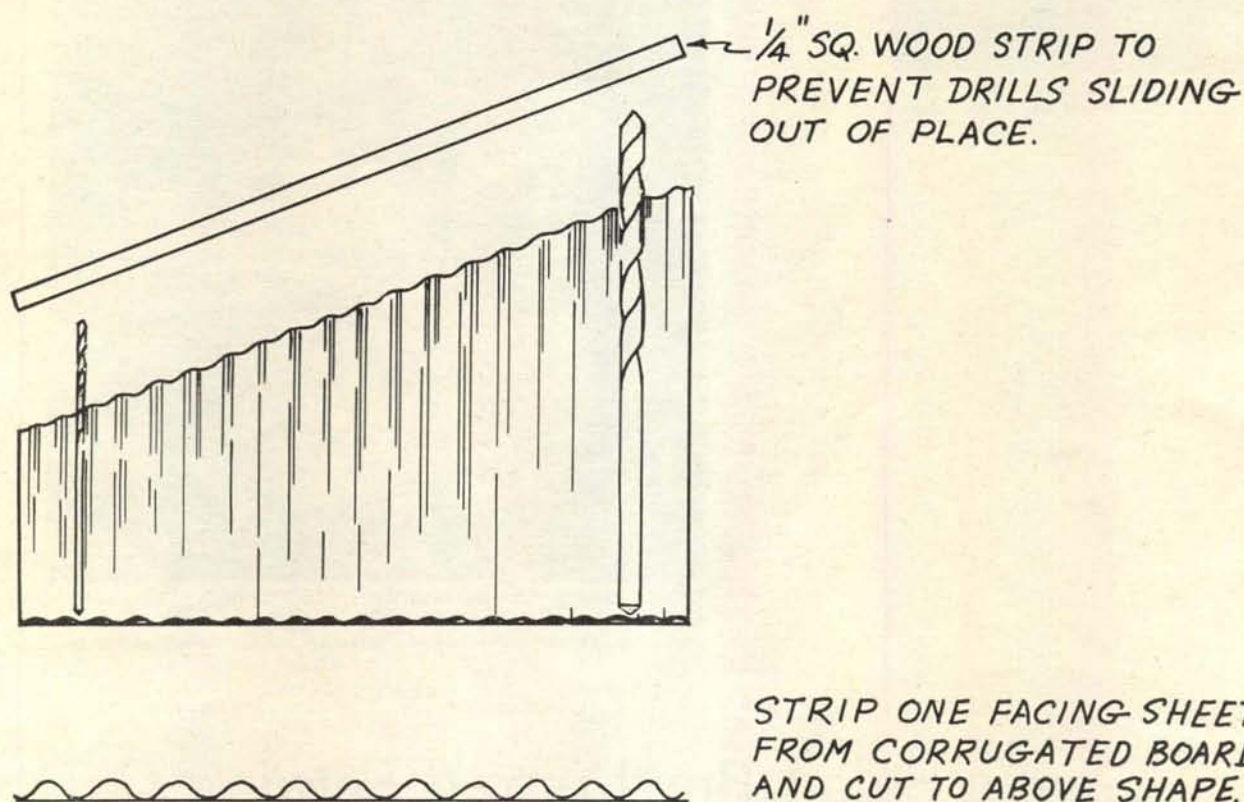


FIGURE B

of the piece is then brushed with glue, then the piece is set in the drawer and tacked in place with 3/8" brads. The drawer now has recesses for each of the tools to lie in, always in the same place (Photograph 2).

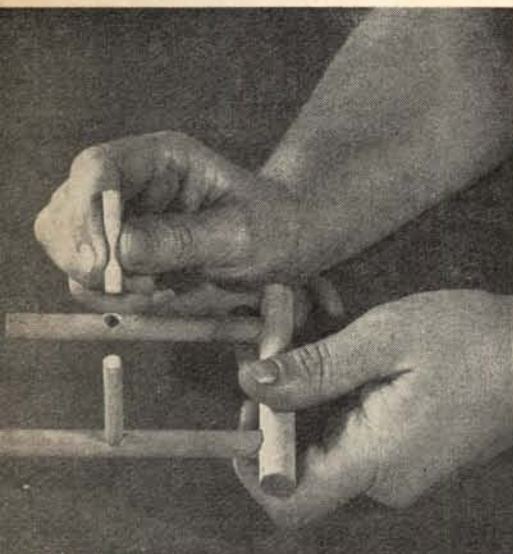
THE PROCEDURE for fitting up a drawer for such items as drill and auger bits (Photograph 3) is equally simple. For the auger bits a piece of 1/2" or 3/4" hardwood about one half to one inch wider (depending on drawer depth) than the diameter of the largest bit and equal in length to the inside drawer width is selected. Successive holes are drilled along the center line of its widest face using each of the bits to be stored (Figure

A). The holes should be spaced about 1/2" apart on their diameters. The drilled piece is then cut lengthwise along the center line of the holes and you then have two recessed blocks for the bits to rest in. They are then brushed with glue along the bottom and set parallel to each other in the drawer. They may also be held in place with wire brads. The length of the bits determines their distance apart.

For the drills a piece of corrugated board is used (Figure B). Take the facing sheet off one side exposing the corrugations and cut to the desired length, counting each recess or valley between corrugations as a space for one drill. Then cut one side

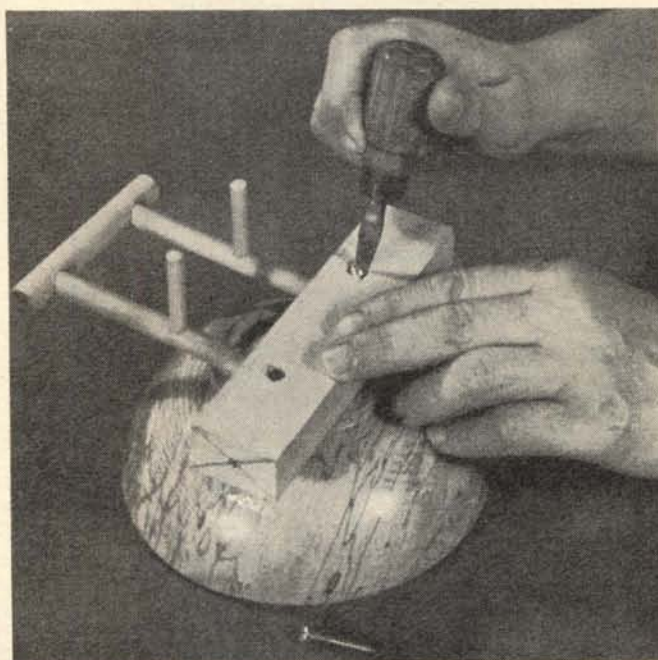
at such an angle that the two end drills (largest and smallest) will extend about one half inch beyond its edge. Glue the piece into one corner of the drawer. Then glue a strip of wood about 1/4" square and as long as the angle side of the corrugated board in the drawer slightly ahead of the drill points. This will serve as a stop to prevent the drills from sliding out of the recesses when the drawer is opened or closed.

These same or similar means may be used for other tools, such as chisels, screw drivers or pliers and the result will be tool chest and workbench drawers in which there is a place for everything and everything will be in its proper place. THE END



PHOTOGRAPH 1—Drop glue into the holes in the long handle pieces and fit in the support pegs.

This little cart will push its way into the affections of many a woman with an eye for a table novelty.



PHOTOGRAPH 2—Turn the bowl inside down, set the axle in place and screw it to the bottom of the bowl, passing the screws through holes previously located and drilled and screwing into the bottom of the bowl.

Turn a Salad Bowl *into a Serving Cart*

ELMA WALTNER

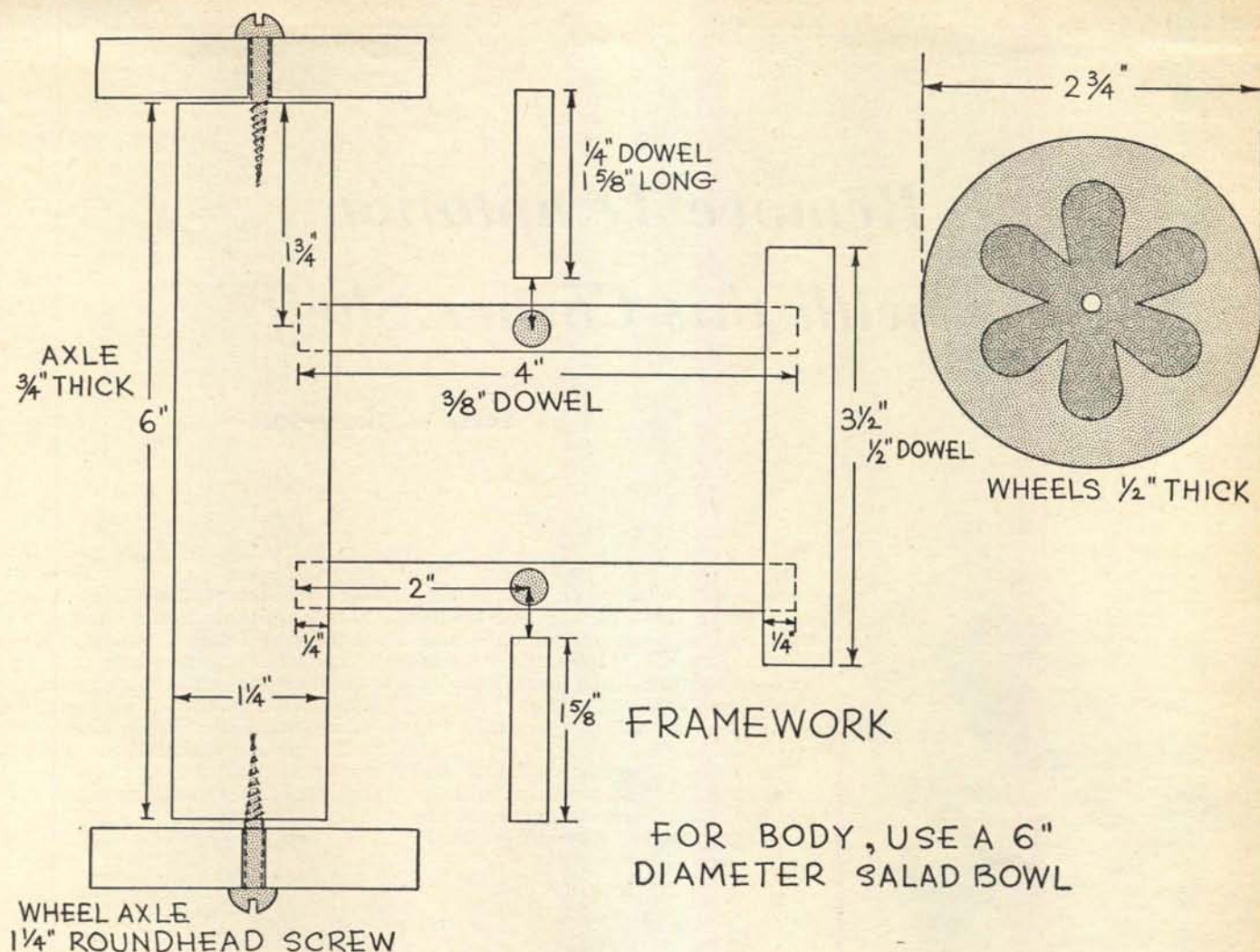
A NOVEL little pushcart for serving candies, snacks or for other uses may be easily made by using a salad bowl for the body and odds and ends of lumber and dowels for the framework.

A six-inch diameter salad bowl may be found in the housewares department of any dime or variety store. Pick one with an interesting wood grain. Since the bowls are light hardwood, some of them will have no pronounced grain but among the lot you can usually find one that does have a pronounced grain pattern. This makes a more attractive finished piece. Since the bowls are already finished you will need to do no more work on it.

Use a scrap of $\frac{3}{4}$ " thick pine stock for the axle. The wood from the end of a fruit crate will do very nicely if you haven't any scrap lumber. Cut the piece 6" long and $1\frac{1}{4}$ " wide. Dowels in three thicknesses make the

pushcart handle. For the two long pieces use $\frac{3}{8}$ " dowel, for the end crosspiece $\frac{1}{2}$ " dowel and for the two support pegs $\frac{1}{4}$ " dowel. Cut the pieces to the lengths specified in the accompanying drawing.

Drill $\frac{3}{8}$ " holes, $\frac{1}{4}$ " deep into the axle piece, with the center of each hole located $1\frac{1}{4}$ " from each end (see drawing). Drill $\frac{3}{8}$ " holes into the handle crosspiece with the holes spaced the same distance apart as on the axle. Drill $\frac{1}{4}$ " holes in the center of the two long pieces of $\frac{3}{8}$ " dowel (see drawing). Fit the long handle pieces into the holes in the crosspiece. Put a bit of glue into the holes in the crosspiece before pushing in the dowels. Fit the short pegs into the holes in the long handle pieces, after putting glue into the holes (Photograph 1). Put glue into the holes in the axle piece and fit in the ends of the long dowel pieces. Turn the bowl upside down and fasten the axle to the bottom with screws,



passing them through holes drilled through the axle piece, and screw into the bowl bottom (Photograph 2). The axle should be placed ahead of the center of the bowl. Holes are located and drilled before fitting the handle assembly into place.

With a compass, lay out the wheels on $\frac{1}{2}$ " thick wood. You may use either plywood or the end of a fruit crate for wheels. In the case of fruit crate wood, it is usually a little thicker than $\frac{1}{2}$ ", which is quite satisfactory. Drill a hole through the center of each wheel just large enough to allow the wheel to turn freely on the shank of the roundhead wood screw which is used for the wheel axle. For $\frac{1}{2}$ " thick wood use a $1\frac{1}{4}$ " long roundhead nickel screw. If thicker wood is used for the wheels, use a screw $1\frac{1}{2}$ " long. Sandpaper the wheel thoroughly and do the decorating before attaching the wheels. Give the wheels a coat of shellac and allow it to dry, then paint on the design and the edges of the wheels with enamel in any color. When the enamel has dried, slip the screw through the center hole and screw into the end of the axle. Draw the screw up so the wheel will not wobble but not so tight that the wheel binds against the axle. Attach the second wheel.

Now your pushcart is ready for use or for a gift. Fill it with candy (Photograph 3) for TV or reading nibbling or with salted nuts or tidbit crackers, or use it for whatever purpose you like.

THE END



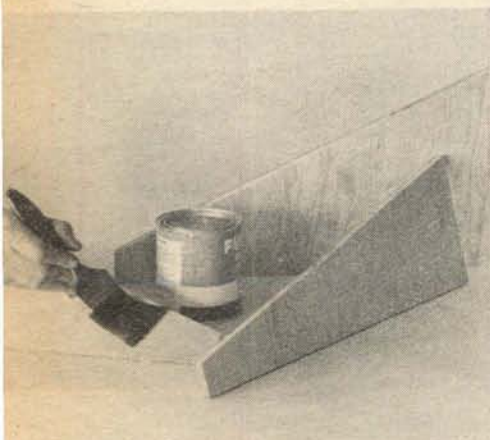
PHOTOGRAPH 3—The completed bowl pushcart makes a fine candy server.

Remove Temptation with this Corner Shelf

EARLE W. THOMPSON



PHOTOGRAPH 1—Mommy turned her back a moment, and here goes "Active Allen" after the sugar bowl. Soon there will be sugar in the cream and cream in the sugar. Much fun for Allen, but a mess for mommy to clean up.



PHOTOGRAPH 2—The first step is to cut $\frac{3}{8}$ " three ply to the sizes and shapes shown in the accompanying sketch, and apply a coat of sanding sealer.

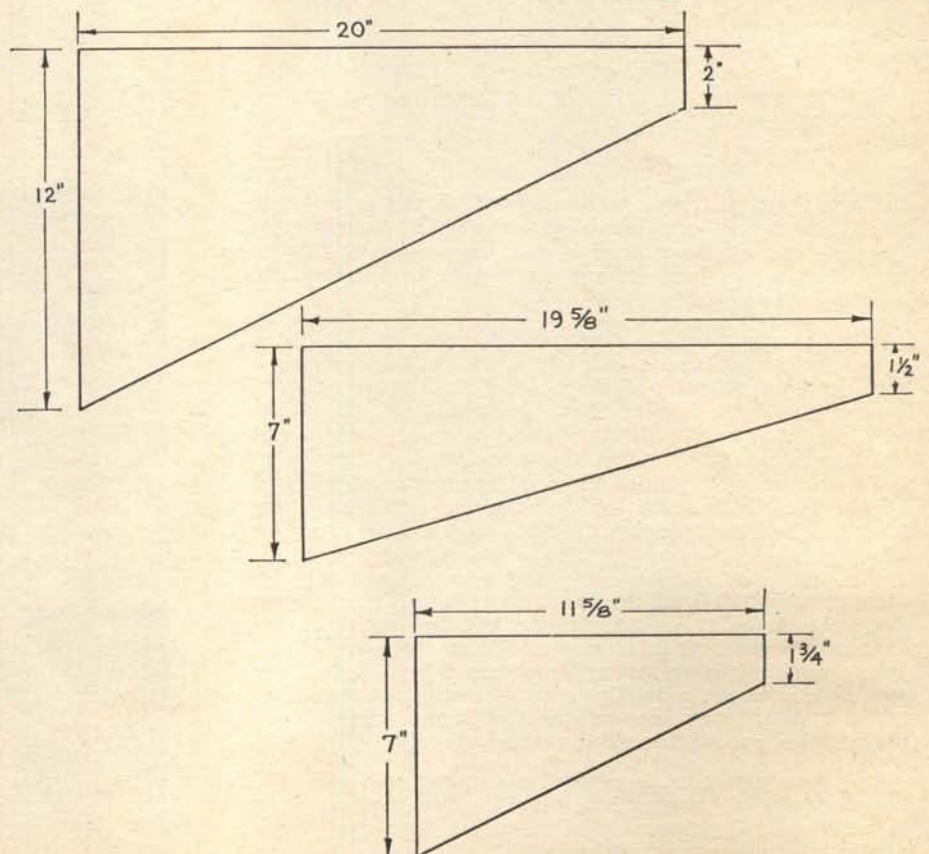
PARENTS KNOW that when their youngsters reach the climbing and reaching stage, nothing around the house is safe. This is especially true of such interesting (and difficult to clean up) items as sugar bowls, creamers, salt and pepper shakers, and the like.

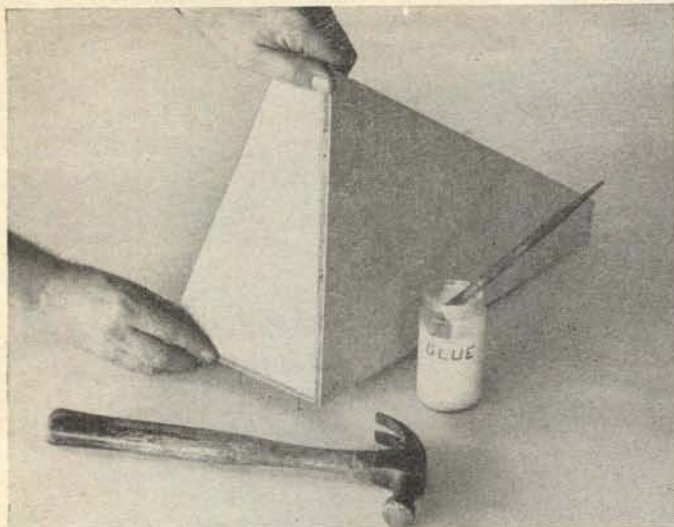
The Robert Reyburns of Los Angeles solved this problem with a small shelf for a corner of the breakfast room. Mida Reyburn calls it

her "anti-temptation" shelf, and uses it to keep table items handy for her but out of reach for young Allen.

The shelf is an easy evening or weekend project for any handyman type father, and will save mother a good deal of cleaning up after Junior.

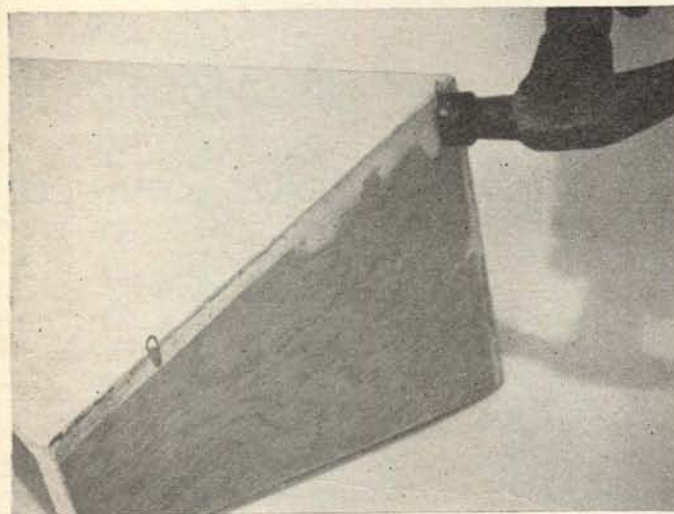
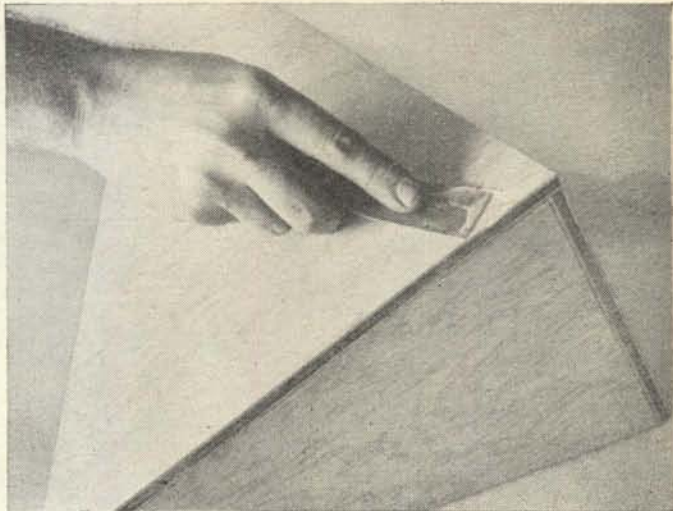
Hanging the shelf over nailheads in the manner shown makes it easily removable for cleaning when necessary.



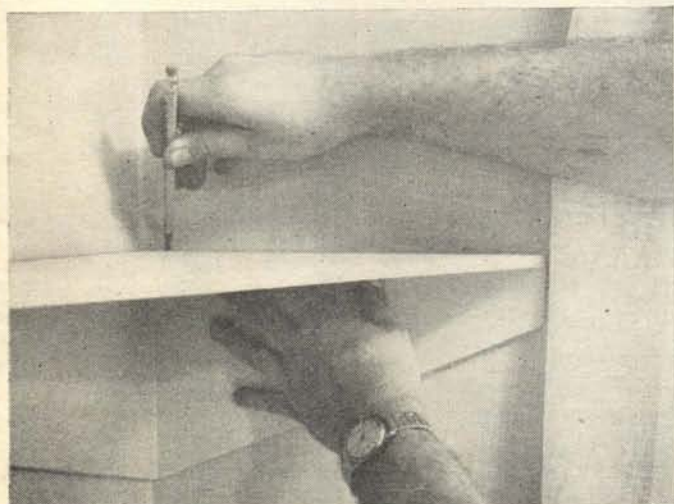


PHOTOGRAPH 3—Assemble with 1" finishing nails and glue, nailing through the top into the back and end pieces, and through the back into the end piece. Care must be taken to drive the nails straight and avoid splitting the plywood.

PHOTOGRAPH 4—Drive the nailheads into the top with a nail set, and fill the holes with wood putty. Go over the outer edges of the plywood with wood putty also, to fill in any irregularities. Sand the shelf well, rounding off the corners and edges slightly. Put on another coat of sanding sealer and sand lightly when dry. You may use varnish for a natural wood finish, or paint to match or contrast the room in which it is to be used.



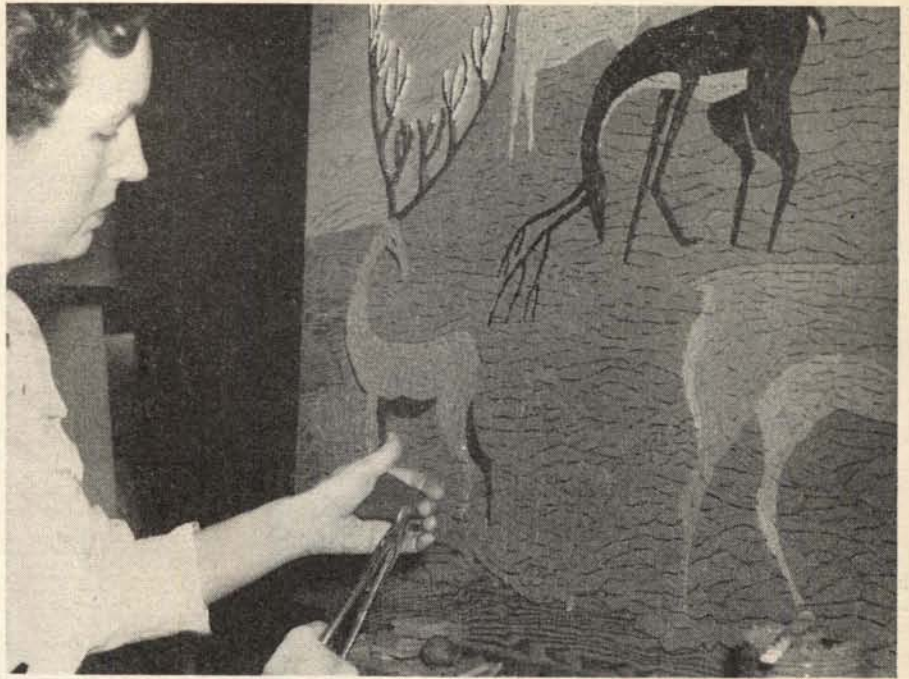
PHOTOGRAPH 5—When the paint or varnish has dried, the shelf is ready to hang. Fasten small soldering lugs (available from hardware or electrical store) to the back edge as shown, using $\frac{3}{4}$ " wire nails driven through the small hole in the lug.



PHOTOGRAPH 6—Hold the shelf in place in the corner, and mark the wall through the large hole in the lug. Drive nails into the wall, angling them downward. The shelf is then hung over the nailheads.



PHOTOGRAPH 7—Now such inviting items as the sugar bowl and creamer can be placed out of reach of the small fry, yet still be handy to the table. The End



Mosaics— an Ancient Art Revived

HILLIS PENN



1. THE CERAMIC tile mosaic is an ancient art form which has grown increasingly popular with moderns, in part because it is well-suited to the home workshop. The required tools are few—a pair of tile nippers, such as the young woman holds here; tile cement and grout, and a good pictorial imagination, aided perhaps by a picture to be copied. The design is drawn on plywood or hardboard or plasterboard, or whatever base is desired. Then the tile is cut and put into place along the main lines of the design—as has been done at the upper left of this picture—with the background color to be worked around it later. When the picture is finished the grout—the filler between the tiles—will be worked into the crevices.

2. The cement is put on each piece as it is applied. A solvent-base mastic, or cement, is required for applying the tile to bare wood. It should be put on with care, since it can be removed from the face of the tile only with gasoline. On plasterboard, a water-base mastic is suitable. The tile recommended is nonglaze natural clay tile. This comes in pieces 1 inch square, 1 by 2, and 2 by 2. It has square edges, and is easier to work with than porcelain tile which may, however, be used for special effects. Uncut squares may be used, of course, but the results are less intriguing. Some tile distributors offer ready-made packages of material; but the imaginative home workshop worker may prefer to select his own pattern and colors from the wide assortment available.

3. The result may have a surrealistic touch, as in this reproduction of an old religious picture. Two points about tile mosaics are apparent in this picture. First, lines can be emphasized or minimized by the way in which the tile pieces are cut and applied. Around the top of the head, concentric lines reiterate the shape; in the beard, a confusion of lines produces a desired effect. Second, the individual tiles can be emphasized or not by the color of grout—the filler between the tile bits—which is used. Here again the beard shows the effect, with the lines between the dark tile filled with light-colored grout. Commercially, grout normally comes in white, but can be colored as desired. What is called dri-set grout is recommended, as it requires less water than other types. One other point: For wall hanging the backing of the picture need not be heavy; but if the result is to be used for a table top it is important to use $\frac{3}{4}$ -inch plywood or heavier. If there is any bending in the base, the grout will be cracked out.

4. And if there are younger members in the family, they can get into the act, too.

THE END

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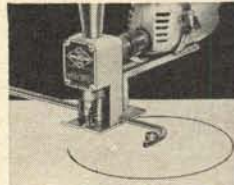


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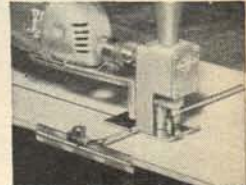
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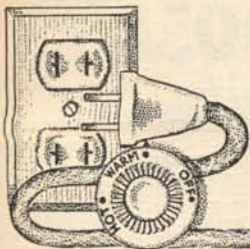
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Advice to apply to appliances

PART XI: Motion Producing Appliances; The Electric Drill

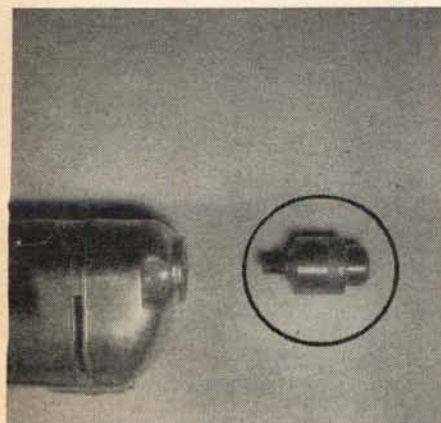
J. J. LIGHTER



PHOTOGRAPH A—This is one type of medium priced 1/4-inch electric drill very popular with home mechanics.



PHOTOGRAPH B—While limited to lighter work, the drill type shown above appeals to many because of its low initial cost.



PHOTOGRAPH C—The chuck is removed from drill A by unscrewing it.

ABOUT THE first power tool that the American male adds to his collection is the portable electric drill. Far more than a drill, it is actually a power plant capable of operating many mechanical attachments. It ordinarily sees hard and frequent use. If you don't have one, you probably want one; if you have one, you will want to keep it in good working order. The purpose of this article is to show you how the electric drill operates, what malfunctions are common and how to locate and correct these troubles.

Beyond the information that will enable you to protect your investment we shall discuss certain consumer information that will make you a better user and a more accurately informed purchaser. This whole matter of the electric drill is very important. If one of milady's luxury appliances (such as an iron, toaster, or mixer) breaks down she can find some other way to get her work done, but should a good WORKBENCHER revert to ordinary manually operated drills?—never, I say

Electric drills, like automobiles, come in different price ranges. Photograph A shows a drill which represents the moderately priced, heavier duty type. Photograph B, on the other hand, shows an economy model drill which costs less originally but which cannot be expected to handle the heavier jobs as does the one in Photograph A.

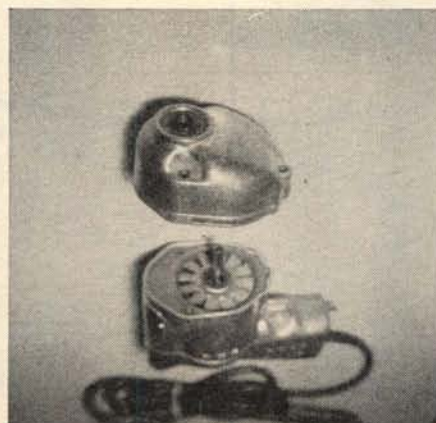
As with other electrical appliances, the home craftsman must know both the mechanical and electrical aspects of the device if he is to attempt an intelligent diagnosis of its troubles.

We always try to cover electrical and mechanical details of operation plus causes of troubles. It is rather difficult to completely cover every trouble that could possibly happen to an electric appliance. The appliance repairman frequently is confronted with a situation that he has not encountered before. In this case he must rely on his reasoning ability—just as you will often have to do. Regular WORKBENCH readers will by now be familiar with series motor hookups, so understanding the electrical operation of the electric drill should not be difficult. A complete electrical check cannot be made without taking the drill apart so we shall explore disassembly first.

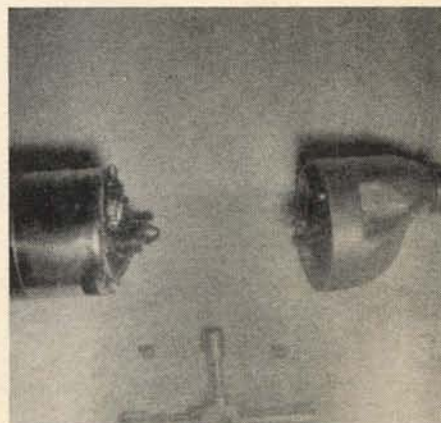
Mechanical Considerations

FOR PURPOSES of identification we shall hereafter refer to the drill shown in Photograph A as drill A and the one shown in Photograph B as drill B. Photograph C shows drill A with the chuck removed. The chuck is removed by unscrewing it. Actually this is not necessarily the first step in disassembly. On this model the chuck need not be removed unless the gear assembly is going to be taken apart. A sander attachment (which will be shown later) is available for this drill. If it is to be used, the chuck must be removed and a special part screwed into its place.

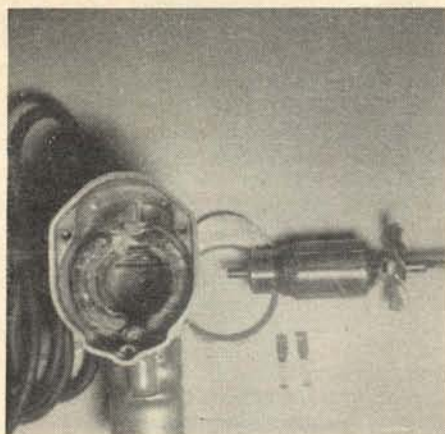
The gear case assembly of drill A is removed from the motor case assembly after taking out three screws (Photograph D). In Photograph D the armature shaft and the cooling fan can be seen at the motor case. Remember to put all screws and



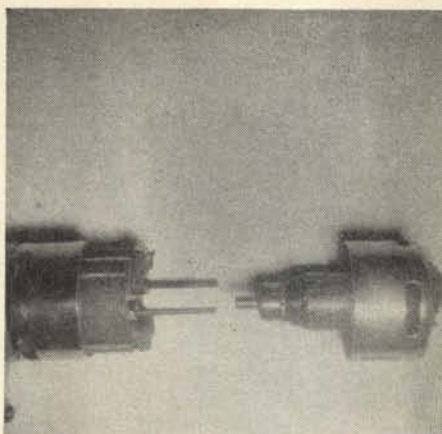
PHOTOGRAPH D—Drill A, with the gear case removed from the motor section.



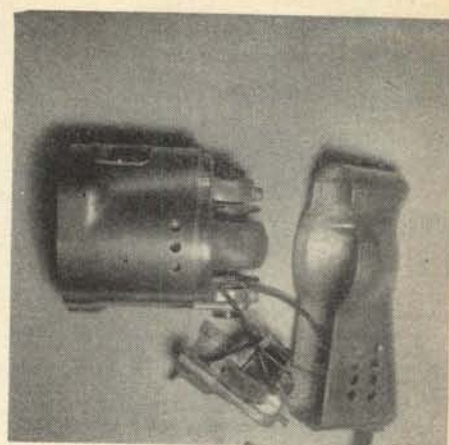
PHOTOGRAPH E—Drill B, with gear case removed.



PHOTOGRAPH F—In this view of drill A can be seen the armature, brushes, fan shroud, and the field coils, which are inside the motor case.



PHOTOGRAPH G—In drill B removing one end of the motor case also removes the armature as shown here.



PHOTOGRAPH H—With the handle removed from drill A, the brush holders and switch may be seen.

small parts into a dish or similar container so that they will not be lost. Photograph E shows the gear case removed from drill B. The hex nut driver shown at the bottom of the photograph aided in proper removal of the acorn nuts used on this drill. In drill B there is no special grease retaining partition; the grease is exposed when the gear case is taken off of this type so care must be taken to avoid smearing the grease around.

The fan shroud and the armature can be lifted from drill A without difficulty. Photograph F shows the motor case, fan shroud, armature (with fan on shaft) and brushes with their springs. The field coils may be seen inside the motor case. Care is necessary at this point not to lose any of the small parts, particularly washers which may stick to the shaft or bearings and get lost later—remove them and put them in the small parts dish. Remember, too, the order in which they came off. If you are not sure you will remember, write it down. The brushes must also be removed so that they will not be lost or broken. Neither on drill A nor on drill B are the brushes accessible from the outside. Since this is frequently a fact in similar devices, be sure that you install the brushes at the proper time before completely reassembling the drill (or other device)—when you are ready to put it back together.

Drill B also uses a cooling fan which is mounted on the armature shaft. Photograph G shows one end of the motor case removed from drill B. The fan cannot be seen because of the motor case end. On less expensive drills of this type it is an economic necessity that more attention be given to manufacturing costs than to servicing requirements. For this reason, working on them may prove to be more of a problem than with the costlier types. On drill B, for example, the armature is semi-permanently attached to the end of the motor case; the gear case and chuck are all fixed into one unit in

a similar manner. In all fairness to drill B, however, you must remember that it cost only about half as much originally and the particular one shown has seen frequent light duty work for about eight years and even now seems to need no more attention than an occasional oiling. The removal of two more nuts from the through bolts (long bolts running from end to end in some motors) was necessary to remove the armature and end case as shown in Photograph G.

Removing the handle of drill A, as in Photograph H, exposes the brush holders and the switch. The handle is held on by two screws, on drill A, and another smaller screw secures the switch. In Photograph I the motor of drill B has been disassembled down to the brush holders. These brush holders, unlike those in drill A, do not have a removable cap and are closed at one end. It is necessary with this type of brush holder to install the springs and brushes, then hold them back in place while the commutator is slipped in between them (if you need an excuse to cuss this may provide ample opportunity).

Drill B's switch is held in place with a lock nut rather than a screw. A special trigger mechanism is used to actuate the switch in drill A. Both switches are "spring-loaded" to the off position. This means that a spring holds the electrical circuit open except when you close the switch. Some drills, like drill A, have a provision for locking the switch closed which is very handy when sanding, buffing or doing some other job requiring more than a minute or so.

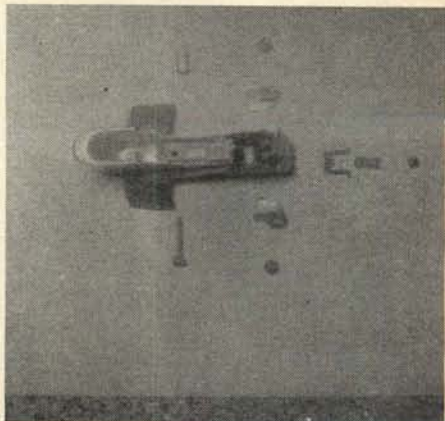
It is usually inadvisable and unrewarding to attempt to repair the average small switch used in appliances and power tools. Photograph J shows the reason for this—there are just too many small parts, which like paper plates, can be counted on only for a period of time, then must be thrown away. This particular switch, from drill A, proved to be an exception, however; it was repaired as an experiment and will last at least for

a time. Comparatively speaking, this switch was easy to get apart and put back together; it was repaired by bending the leaves so that they would make better contact. In operation the trouble symptoms exhibited by the drill had been first erratic speed and then failure to operate.

REASSEMBLY OF the drill—when the time comes—should be easy if you have taken care to place all small pieces in a container and have noted the placement of parts originally. As-



PHOTOGRAPH I—Brush holder end of drill B's motor.



PHOTOGRAPH J—Some of the many small reasons why it is usually not worth the trouble to attempt to repair a drill switch.



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sembly is just the reverse of disassembly and for the careful WORKBENCHER should prove to be no problem. Part of the reason for disassembly was to make electrical checks, if such a need is indicated, but mechanical troubles take their toll too. One drill owner complained that his drill had become very noisy. It sounded like grating of metal when in operation. At first it was feared that the armature shaft or the frame had been bent in dropping or during a previous repair. Examination of the field coil pole shoes (laminated iron core around which the field coils are wrapped) and the armature laminations failed to disclose any evidence of rubbing. The bearings had been kept oiled and there was no binding at this point. The fan was not bent or striking any portion of the frame or shroud. All of these are good possibilities but were not the answer to this problem.

Another possibility was that of broken or worn gear teeth or the worm gear on the armature shaft; results zero. Naturally there was grease in the gear case, that was plain to see. There didn't seem to be any logical avenues left upon which to approach the problem. Solution: a more intelligent inspection of the gear case revealed that while there was grease in the gear case most of it had been thrown to the sides of the case where it did not contact the gears. The gear case was packed with the proper grease, the drill reassembled, and it worked like a charm!

The manufacturers of some drills market a special grease for this purpose. It is suggested that this be used. Grease that is too heavy will impose a drag on the motor, causing it to slow down and overheat. A lubricant that is too thin may easily leak. Then too, some greases that appear to be of the proper consistency at normal temperatures may thin out excessively at higher temperatures.

There is no reason to suspect a drill cooling fan to be bent unless you have dropped the armature while

working on it. Since the fan blades usually bend easily a few words should be said about straightening the blades. Figure 1 shows how the tracking of a fan can be checked. A fan that tracks will have all the blades located in one plane so that each one follows the other exactly as the armature is rotated in front of your eye. If this is not the case, the blades can usually be straightened by hand until they pass this test. Bent blades, off course, will unbalance the armature.

As far as you are concerned a bent armature shaft is almost a hopeless repair. Although some drill motors use self-aligning bearings (like drill B) others (like drill A) use rigid bearings. Self-aligning bearings will allow some inaccuracies but this is restricted by the necessity of having the pole shoes fit close to the armature.

Electrical Considerations

FIGURE 2 is a schematic drawing of the electrical circuit of a typical electric drill. It consists of a switch (spring loaded open), an armature and brushes, and two field coils which are connected in series with each other and also with the armature. Because of this type of connection it is called a series wound motor. It will also operate from either AC (alternating current) or DC (direct current) and therefore is also termed a universal motor. When the switch is closed, current flows in the circuit. In flowing through the armature coils and field coil windings magnetic fields are set up. It is the interaction between these magnetic fields that causes the armature to rotate, enabling the device to produce motion.

Electrical troubles are usually classified as open, shorts, or grounds and they may exist as a total condition or as a partial condition. For example, if just a few turns of a field coil winding were shorted together this would be a partial short rather than an entirely shorted coil. If, on the other hand, the two main wires in the line cord were to wear

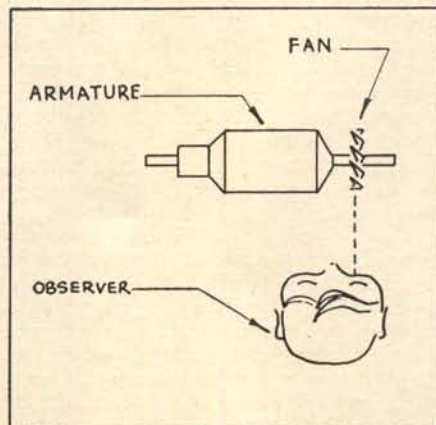


FIGURE 1—By rotating the armature and fan in front of you at eye level you can tell whether or not the blades are properly aligned.

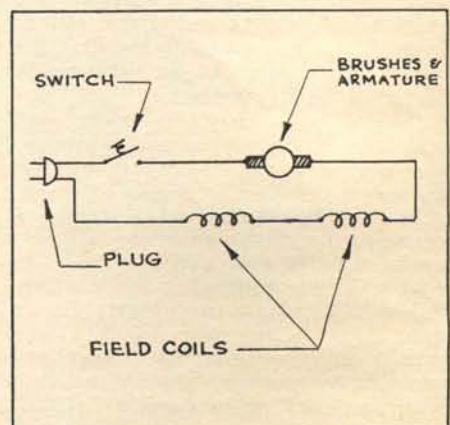


FIGURE 2—A schematic diagram representing the electrical circuit of an electric drill.

through their insulation and touch, this would then be a short—for sure! If such a short occurs and the drill is plugged into a properly wired electrical outlet a fuse will blow, thus protecting the drill and the house wiring from further damage.

A grounded condition exists when some part of the electrical circuit touches the metal frame or case of an appliance and makes it "hot." It then is a potential shock hazard to the user. For this reason major appliances like automatic washers—which are frequently placed on damp cement basement floors—have a three-prong plug. This extra wire connects the frame of the washer to the grounded portion of the house electrical circuit. By so doing it eliminates the possibility of the user touching a faulty washer and grounding the electricity through his body—a situation that could cause shock or even death. Smaller electrical devices, including some electrical drills, have a wire protruding from the plug which the user may connect to a screw at the outlet box or other ground and thus insure his own safety if a grounded condition exists in the drill.

AN OPEN condition is one in which the electrical circuit has been interrupted or broken, thus prohibiting the flow of current. In the circuit of the electric drill an open can be caused by a broken wire, a loose connection, an inoperative switch, or even a brush that fails to make contact with the commutator, any one of which would normally stop the flow of current in the circuit. A partial open would be one in which the electrical connection was so poor that less than normal current would flow in the circuit. Since there are many separate coils of wire in the armature winding, an open in one would not open the entire circuit. It would disrupt the balance of current flow, however, and probably be evidenced as excessive arcing (electrical sparks jumping from one conducting surface to another) at the brushes and commutator.

When an appliance fails to operate one should always check to make sure that the plug is making good contact in the outlet and that the appliance switch is on. Of course you have to be sure that you have power at the outlet. This can be checked with a meter or indicator or by simply plugging in an appliance known to be good—such as a lamp.

Some appliance troubles can be cured by repairing, others only by replacement. An open in the line cord may be repaired by twisting the wire together, soldering, and wrapping with tape. It may be necessary to splice in a whole new piece. This of course is a temporary measure—or at least it should be.

If an open is found in one of the connecting wires of the internal circuit, chances are it can be repaired

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the same way. An open in a switch occurs because of the switch contacts themselves. Although there may be a rare exception—replacement of the switch is the best answer for a satisfactory job. An open may also occur because of looseness at the point of attachment at a screw or solderless connector (wire nut). If a wire nut refuses to remain tight, try bending one of the wires over double and screwing the nut on again.

An open in the armature itself or in one of the field coils usually calls for replacement of the armature or coil. Remember that field coils are usually sold as sets and should be replaced that way. In trying to save coils as spares you run the risk of selecting the wrong coil or connecting it wrong. They are sold in sets so you will not make a mistake in connecting them and get, for example, more north poles than south poles or vice versa. An open in the armature is sometimes due to loose wire at the commutator segment; this of course can be resoldered. Sometimes faulty brushes cause the armature or field coils to receive unjust blame for an open. Brushes occasionally stick in their holders and fail to make proper contact—cleaning the holders should remedy this. Brushes that have worn too short may not make proper contact and will, of course, have to be replaced.

OLD AND well worn line cords are frequently the source of much trouble which is often blamed on the appliance itself. A short in the line cord is usually easy to detect because of the burned place in the cord. A line cord in bad enough shape to be detected with the naked eye should be replaced **before** any such calamity befalls it. A short in the field coil windings or in the armature, as far as you are concerned, usually means replacement. Carefully inspect the commutator as the short may be due to metal particles lodging between the commutator segments; these of course must be picked out.

You might discover a bare wire on one of the field windings or connecting wires which is touching the drill case and creating a ground. A piece of electrical tape over the wire should eliminate future trouble. It is more likely, however, that you will have to replace a grounded field or armature because the trouble is in some inaccessible place.

Once in a while it will be impossible to turn off an appliance. This aggravating condition is usually due to a shorted switch which should be replaced. A shorted switch as referred to here is not a short in the usual sense. It merely means that the contacts have become welded together or some similar trouble that makes it impossible to break the circuit in the regular manner—a blown fuse will not result.

Finding the trouble is usually the biggest chore in electrical appliance

repair; after that you must make a decision as to whether the part can be repaired or if it must be replaced. Since locating the trouble is so important let us consider trouble shooting next—we have already told you what to do when you discover various troubles.

Electrical Trouble Shooting

IN ORDER to pinpoint the source of electrical troubles some testing device will be needed. Various WORKBENCHERS have designed their own or used types described in earlier articles. Certainly one of the most versatile instruments available at moderate cost is a utility tester of which one type is shown in Photograph K. The leakage detector sec-



PHOTOGRAPH K—Leakage indicator portion of the utility tester being used to check the continuity of a switch.

tion of the meter is shown being used here to check the continuity (completeness of electrical path) of the switch used in drill A. For this check the tester is plugged into an electrical outlet and the test prod terminals inserted into the "COM." and "LEAKAGE" jacks. When an electrical circuit exists between the test prods, the neon bulb will light. A schematic of this portion of the utility tester is shown in Figure 3.

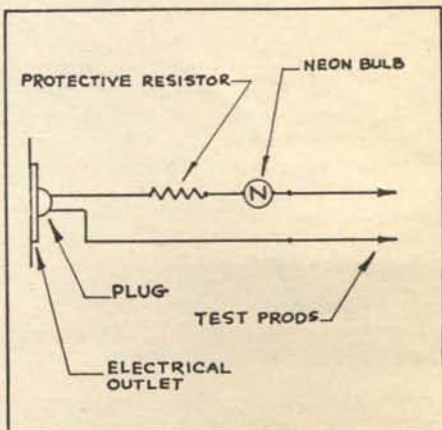


FIGURE 3—Schematic diagram of the leakage indicator portion of the utility tester. When the prods are touched together or when a good circuit is placed between them, the neon bulb will light.

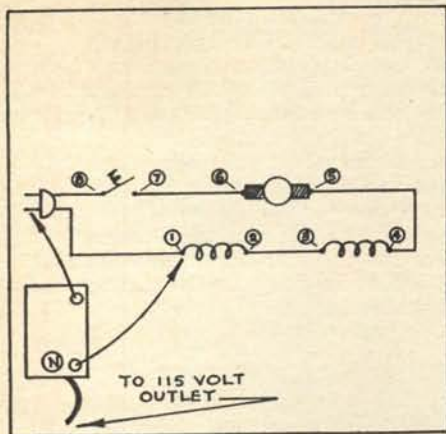


FIGURE 4—As shown above, the leakage indicator is at the first check point in checking the drill circuit for continuity.

Figure 4 shows the leakage indicator being used to make a continuity check of the drill's electrical circuit—in searching for an open. The check points in the system are numbered progressively. One test prod or clip is attached to a fixed point in the circuit and the other moved progressively along the circuit. If there is an open in the circuit a check point will be reached at which continuity will no longer be obtained. The open, then, will be located between the point where no continuity indication was received and the last point where it was, Figure 5. In order to double check, isolate (totally disconnect from other parts) the suspected part and check it individually as the switch in Photograph K. Do not forget to hold the switch closed if it is included as part of the circuit under check or the circuit will naturally show open! You may experience a shortage of hands in doing this, as was the case in the photograph K situation. By removing the switch spring, however, the switch stayed closed by itself and the matter was resolved.

How do you discover a grounded condition if one is suspected—without exposing yourself to possible shock? With the electric drills shown attach one test prod to the metal case of

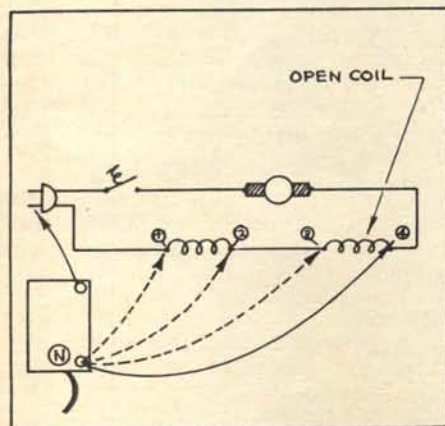


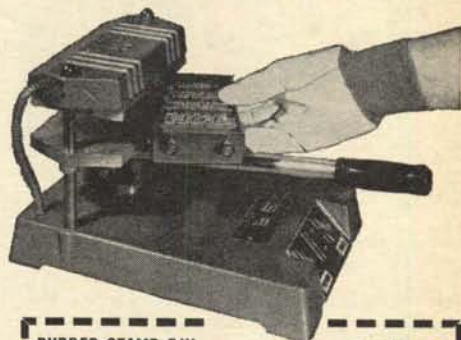
FIGURE 5—With an open field coil as shown above, the neon bulb would light at check points 1, 2 and 3, but not at check point 4.

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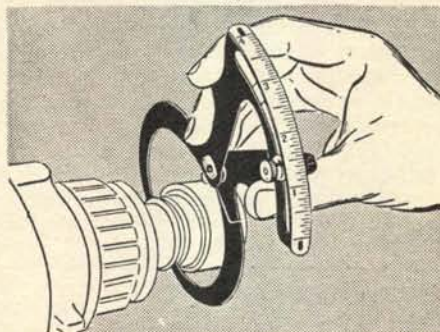
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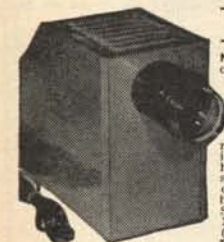
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the drill, close the switch, and in turn touch the other prod to each of the two prongs on the plug. If the leakage indicator bulb lights, then there is a circuit between the electrical and a metal part not designed to be a part of the electrical circuit; hence, a ground. In order to discover which part of the circuit was at fault each portion would have to be isolated from the others. If continuity exists between the electrical circuit of the part under test and a metal part not intended to be a portion of the electrical circuit, then a grounded condition is present. A grounded armature, for example, may be checked by placing one test lead on the commutator (part of electrical circuit), and the other on the armature shaft (not normally a part of electrical circuit); if continuity exists, the armature is grounded. Figure 6 shows the checking of an armature for a ground.

Shorts have already been described as being located mainly by visual examination but a few additional statements may be useful. A partial short in the motor will usually cause poor operation and overheating—if there is any operation at all. A shorted armature can be detected with a growler. A growler is so-called because of the growling noise it makes when in operation. Most appliance repair shops have growlers but it is not profitable for you to purchase one for infrequent home use. If you suspect a short in the armature take it to an appliance repair shop for checking. Except for a surface short at the commutator (which can be detected by sharp observation) a shorted armature, by the law of averages, is not too likely to be your trouble.

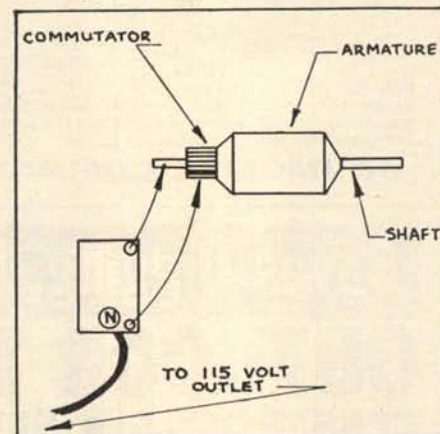
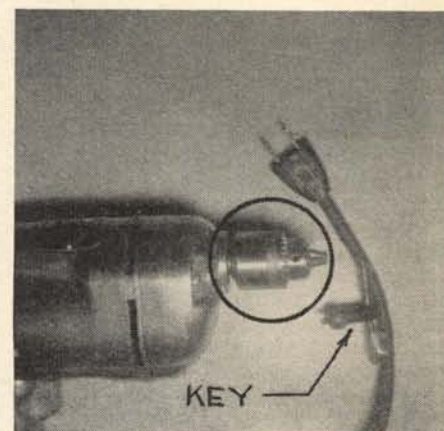


FIGURE 6—Using the leakage indicator to check for a grounded armature.

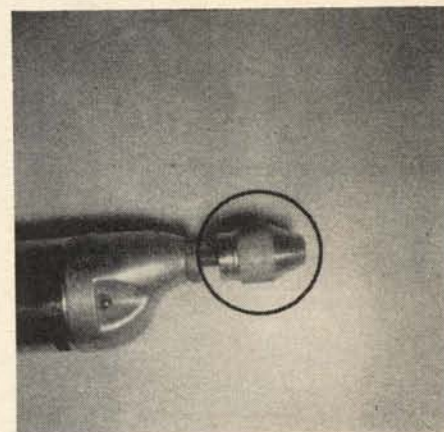
General Information

ONE OF the things I am most often asked by readers of WORKBENCH is where to obtain parts? Except maybe for bulbs most hardware stores simply don't handle appliance repair parts—they aren't in that business. The most logical source of supply is an appliance repair shop. Due to circumstances you may have

to write to the manufacturer about your needs. He will either take care of the matter directly or refer you to the nearest authorized parts distributor or authorized repair station. If making the purchase in person, take the old part along with the make, model, and other pertinent information that you may need. Furnish full details, too, when writing to the manufacturer. General information is on the nameplate and the part itself may be marked with a number.



PHOTOGRAPH L—Geared chuck and key.



PHOTOGRAPH M—This chuck is tightened by hand and uses no key or wrench.

Photograph L shows drill A with its geared chuck. The chuck key has been taped to the line cord to insure that it is always around when needed. A good geared chuck is a necessity for heavy duty work. The shank of an expensive twist drill can be chewed into uselessness by failure to tighten the chuck securely; to be sure—tighten at all three holes.

Photograph M shows the chuck of drill B. This type uses no key to tighten and is operated like the chuck on a hand drill. Needless to say, for more than light work a chuck of this type is not satisfactory. For tougher jobs one must resort to pliers for tightening, with the result that the chuck soon becomes scratched and marred.

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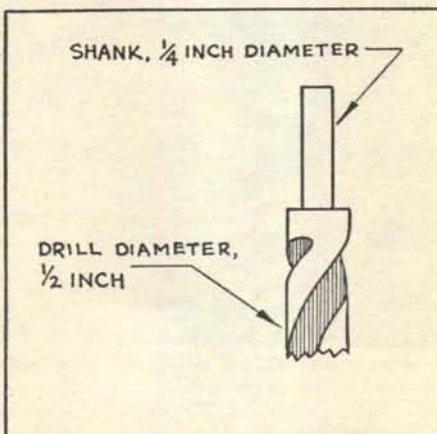
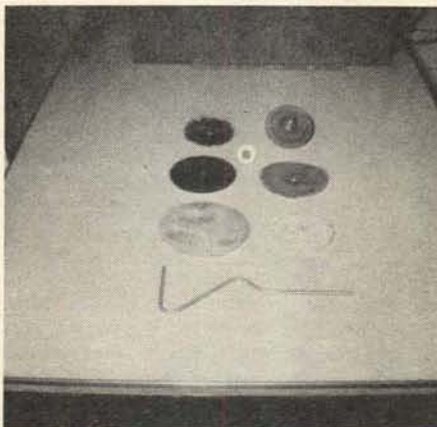


FIGURE 7—This shows how the capacity of a 1/4-inch drill can be increased. Twist drill sets may be purchased with 1/4-inch shanks but larger drill diameters.



PHOTOGRAPH N—A variety of worksavers available for electric drills.

as drills (twist drills) instead of bits. So help me, boys this is correct—check a tool catalog if you don't believe me. Without talking about horses, money, and certain power machinery, bits mean auger bits as used in a brace for boring holes in wood.

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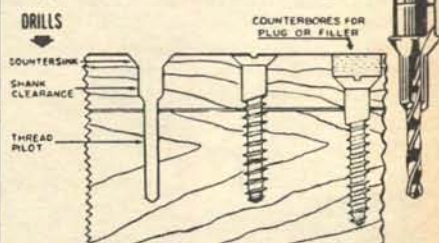
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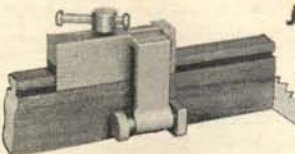
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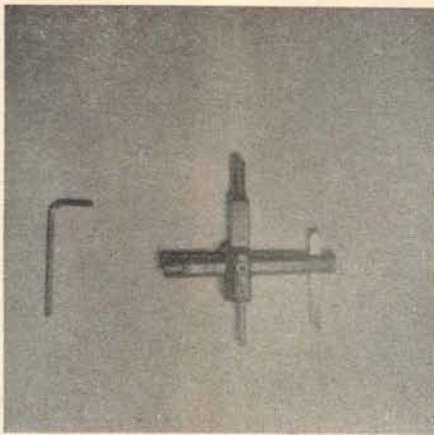
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PHOTOGRAPH O—Adjustable circle cutter.

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PHOTOGRAPH P—This shows how drill A fits into a sanding attachment.

smaller attachments you may recognize as: a paint stirrer, a polishing bonnet and the rubber disc it fits over, a buffing wheel, sanding disc (which is also supported in operation by the rubber disc), wire wheel, and grinding wheel. Photograph O shows a circle cutter which may be used on wood, metal, plastic and other materials. It is adjustable and the Allen wrench shown is needed for the set screws. Photograph P shows how drill A fits into an orbital sanding attachment. Other attachments available include: circular saw, sabre saw, planer, and screwdriver.

In addition to power needs some attachments require that the drill operate within a certain speed range. Don't buy an attachment unsuitable for your drill; the drill nameplate gives operating speed of the drill in r.p.m. (revolutions per minute). The nameplate also gives other vital data including rated amperage. Small motors such as those used in 1/4-inch electric drills may not have a horsepower rating. The amperage rating of a particular drill—assuming efficiency to be about the same—serves as an index of power. Heavy duty drills rated at 2.5 amps can be expected to be much more powerful than drills such as drill B rated at 1.2 amps.

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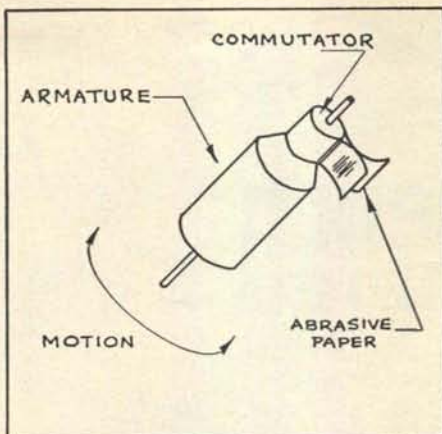


FIGURE 8—To dress the commutator of a small armature place a fine piece of abrasive paper or cloth around it as shown and turn the armature back and forth.

do not forget to oil the drill occasionally. Oh yes, just to refresh your memory Figure 8 shows how a piece of abrasive cloth or paper is used on a commutator to brighten it and take out minor rough spots.

In the next issue we will again discuss the servicing of heat producing appliances, the electric iron in particular. This is mostly a defensive tactic, fellows; the added knowledge will enable you to save more money by repairing these household frills yourself—the better to buy power tools with, of course. Anyway, we have in this article covered enough information to enable you to become reasonably familiar with the care and repair of electric drills—get the point?

NEXT: PART XII, HEAT PRODUCING APPLIANCES, ELECTRIC IRONS.

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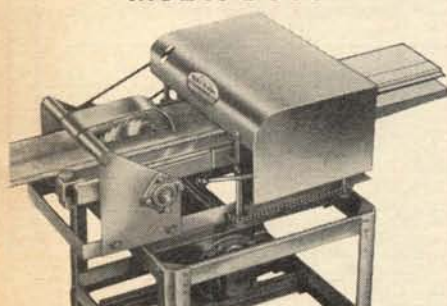
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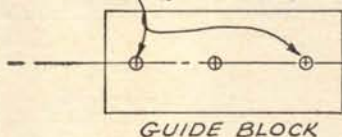
Cutting Slots With Hand Drill

Slotted holes can be made with a power hand drill within the limitations of drill depth and diameter. Slots can be of any length. A drill guide is first made using hardwood such as hardrock maple. Length and width of guide depend on the job at hand. Drill three or four holes in the block on the drill press to a diameter equal to the slot width. Holes must be accurately located at right angle to the guide surfaces, especially the surface to be in contact with the workpiece. The centerline of the holes is located from the edge of the block at a distance equal to the location of the centerline of the slot from the edge of the workpiece.

Clamp a board to the side of the workpiece. Holding the block tightly against the board and workpiece,

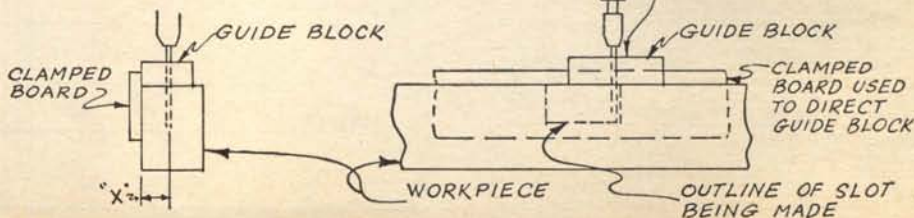
start drilling through one of the holes in the guide, starting at one end of the slot. Pull drill up into guide and move guide along workpiece for a distance of half the diameter of the drill. Drill down again and keep repeating the guide movement and drilling until full length of slot has been drilled. Small movements of the block permits drill to go through partially drilled holes in workpiece without slipping back fully into already drilled hole. Continuous drilling away of the wood will form a clean straight and accurate slot. When bulk of slot has been drilled out, clean out slot of chips and relocate the drill in the guide and this time without lifting out drill, slowly slide the guide back and forth to even out any high spots remaining in the slot.—J. C. Roby

EXTRA HOLES NEEDED IF GUIDE APPROACHES UPRIGHTS NEAR SLOT ENDS OR TO BE USED WHEN OTHER HOLES BECOME ELONGATED.



THIS DISTANCE "X" DETERMINED BY DISTANCE OF SLOT $\frac{1}{2}$ TO EDGE OF WORKPIECE.

THICKNESS OF GUIDE BLOCK DETERMINED BY SLOT DEPTH REQUIRED.



FREE! 2 Pairs Exquisite Make-Them-Yourself EARRINGS
When You Order 1 Pair for Only \$1.00

FREE! 2 pairs exquisite "make them yourself" silver and gold plated earrings—a \$5.00 retail value—when you order one pair for only \$1.00. See how easily you can **MAKE BIG MONEY** in spare time assembling Costume Jewelry at home! No quick... so easy to make... and so easy to sell to friends, neighbors at a handsome profit. You get **THREE** pairs of exquisite earrings plus 48 page How to Make It catalog, plus How to Sell booklet... all for only \$1.00. Money back if not delighted. Rush name, address with \$1.00 now.

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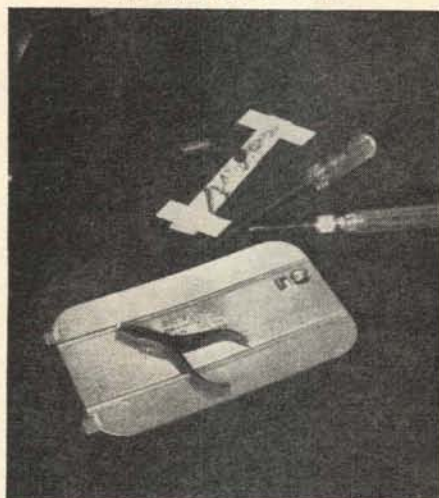
■■■■ TOWARD GREATER VICTORIES ■■■■

Quick Screw Identification

Like many home workshop enthusiasts, I keep a wide assortment of small screws on hand. Small ointment cans, procured from any drug-store, make excellent containers for these items. In order to quickly identify the contents of the can I fasten one of the screws which the can contains to the top of the cover with a short strip of transparent Scotch tape.—H. J. Gerber



Masking Tape Keeps Small Parts Put



If you have ever lost small bolts, springs, pins or other midget parts while repairing some mechanical object, perhaps this idea will prevent it from happening again. Place a length of masking tape, sticky side up, on the worktable and secure the ends by two short pieces of tape sticky side down. Place the small parts on the sticky tape as they are removed and they will be there when ready to be replaced.

Victor H. Lamoy

Renewing Grip of Suction Cups

When suction cups on bathroom towel racks, nut choppers, ash trays and similar items lose their holding power it is usually due to the edge of the rubber having dried and cracked. Trim off the dried rim of the cup and it's as good as new again.

Peter Barna

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Get this spectacular collection of all-different, genuine Airmails from strange, far-away countries in Asia, Africa, Europe, the exotic Orient! World's largest airmail, scarce \$23 stamp, old Zeppelin, many, many others. A truly remarkable collection containing stamps worth up to 30c each at catalog prices! EXTRA: Bargain Catalog PLUS other exciting offers. Send 10c for mailing costs.

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101 ASSORTED SMALL SPRINGS \$1

Stop wasting hours looking in stores for the hard-to-find small spring you need. Here is an assortment of compression, extension and torsion springs in a range of sizes and a low price that will amaze you. Quality tempered music wire. All packed in a convenient, see-through box that fits handily into tool chest or cabinet. MAIL ORDER TODAY! Satisfaction or money back! \$1.00 delivered.

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Use New PATENTED BRACKETS TO MAKE A FOLDING Wall Table!



UP it's a sturdy table
DOWN folds flat against wall!

ATTACH BRACKETS TO ANY TOP:

Flush door, formica, plywood, lumber to make a...

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Mount new Droptop folding brackets to any wall, wood or masonry. Attach your own top, and in minutes you have a sturdy table that folds flat against the wall when not in use. Use anywhere for extra work space. Safety catches lock brackets firmly in place. Made of heavy, rigid steel, baked-on finish. Brackets are 22" long, fit top 22" or wider, any length. Supports up to 1,000 lbs. Send \$9.95 for complete kit: brackets, mounting hardware, wrench. Sent ppd. Money-back guarantee.

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Remember The
COSTLY PLUMBING BILL

CHICAGO—Jan. 1st. Just introduced is a Free Booklet on a New Discovery which enables the Home Owner, Janitor, or Factory Maintenance to clean any Clogged Sewer Drain.

Yet anyone can operate this new Plumbers Flushing Gun which releases air pressure on a solid shaft of water cleaning the most stubborn stoppages up to 200 ft. TOILETS, SINKS, URINALS, BATHTUBS, FLOOR DRAINS and HOUSE-TO-STREET SEWERS clogged with Grease, Rags, Sand, Roots, and paper melt away instantly when struck by the Hammer-like blow of this new unit.

There is no need to remove wall or pipe, or Grease Trap. A special attachment allows water to flow from the faucet through the Gun while air is released on the pipe. Vents or stacks are no obstacle, as force tends to strike wherever the water lays. But now, what is this Plumbers Flushing Gun worth in **COSTLY PLUMBING BILLS SAVED?** Tear this ad out—and write your name and address beside it for **FREE BOOKLET**. Obey that urge. No agent will call. A postcard will do. **SEND NO MONEY—just your name.**

do (Chicago) Phone Kildare 5-1702. MILLER SEWER ROD, DEPT. WJ-F, 4640 N. Central Ave., Chicago 30, Illinois

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Whether you use your jig saw for pleasure or profit, you will want this smart new set of original full size patterns—up to 21" high—for making comical pulleys, attractive lawn ornaments, popular house markers, unusual novelties, etc. (All 102 full size patterns, with simple easy to follow instructions, are yours for only \$1.00 postpaid.)

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Make big profits buying low cost imports abroad (see examples at left) and selling to friends, stores or by mail order. Famous world trader guides you—shows you how to find thousands of exotic imports for full or spare time business, how to pocket profits in advance on foreign drop shipment plan. Complete details FREE! Airmail reaches us overnight. **WRITE TODAY!**

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We want a limited number of intelligent men and women to work at home on an exclusive mail order business proposition. No selling—we furnish everything including literature, names, addresses, stock and ship items for you. All you do is mail for us and receive money coming to your own mail box. **write: MAIL ORDER DISTRIBUTORS (Franchise Division)**

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Things you print literally turn into money. Average \$100.00 job costs you less than \$10 in materials—you pocket the difference. Big profit opportunities almost everywhere. Some make more, some less, but Mr. J. T. Anderson reports he earns over \$400 a week printing Greeting Cards certain times of year.

MEN & WOMEN WANTED NOW

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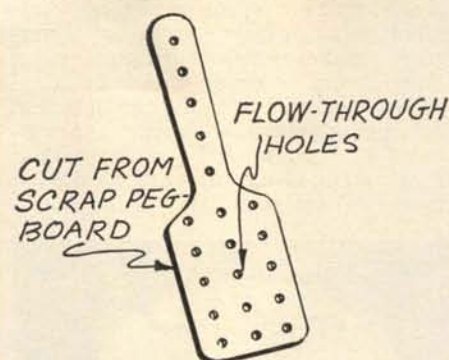
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Please send free BOOKLET, "GLOWING" SAMPLES, "HOME-BUSINESS PLAN." All sent free. I am under no obligation ever.

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This Might Help Pegboard Paint Mixing Paddle



To make fast work of stirring a can of paint, saw out a paddle like the one shown from a scrap piece of perforated pegboard. The "Swiss-cheese" construction of the paddle will allow oil and pigment to flow back and forth through the holes for quick, thorough blending.

John A. Comstock

Protect Outdoor Sockets

Now is the time to protect your outdoor sockets, keeping them clean and dry through winter's storm and gale. Do this by inserting a burned-out fuse in the socket, or a large-size cork will also do the job for you.

Blanche Campbell

Handy Tool Rack

Perforated hardboard panels, together with metal fixtures, enable you to hang your tools on the wall where they're always handy. The 1/8-inch thickness is sufficient for normal use; the 1/4-inch panels are recommended for heavy-duty. Saw panel to size desired, and fasten to wood framing members spaced not more than 16 inches on centers. Be sure there is at least 3/8-inch clearance behind the panel to accommodate the fixtures. Fasten at center and work toward edges. Use brads, nails or roundhead wood screws.

Ted Morgan



Drycleans Clothing for Only 10c Per GARMENT

Saves Drycleaning Bills. Easy Quick. No experience required. Do your garment cleaning at home. Simply clean by dipping. No rubbing. **NEEDS NO RINSING.** Delicately perfumed. Leaves clothes absolutely clean, free of dirt, perspiration odors. For finest Silks, Satins, Rayons, Nylons, Dresses, Suits, Sweaters, Scarfs, Gloves, Lingerie, Drapes, Bedspreads, Hose, Ties. *(Underorder! Earn money!)*

SAMPLES FOR TRIAL immediately to all who send name at once. **Hurry—just a postcard will do. SEND NO MONEY—just your name.**

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Easy to do yourself. Genuine Strand Cane. Woven Cane Weaving for Chairs with Groove. Ash Splints, Flagg Rush, Catalog Dime. Instructions 25c. Complete Seat Weaving Book, \$1.15. Raffia. Basket Reed. Basketry Book, 75c.

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The laminating process itself is so simple that anyone can do it. Neither heat nor pressure are required, nor is any equipment needed except a pair of scissors and a set of measuring spoons.

Here is the basic principle: a hardening agent is mixed with the liquid Castoglas plastic and applied to a sheet of fiberglass mat or fabric. The objects are then placed in position and covered with another glass mat and liquid Castoglas. Within 30 to 60 minutes, the laminated sheet hardens at room temperature. Leaves and flowers in all their natural, colorful beauty are now permanently preserved.

Talented Midwestern craftsman Dorothy Thorne has used maple leaves, lupine, coral bells, statice and wild sweet peas in the placemats shown in the photographs. Also a variety of grasses, clovers and Queen Anne's lace. The enchanting screen shown at right was designed by Nancy Hutchings of Bermuda.

You could make dozens of pieces and never repeat the same design. And doing it yourself enables you to create your own individual table decorations, screens and room dividers which you cannot buy anywhere at any price. Wherever you live, you will find an abundance of native plants suitable for this exciting work.



The art of molding and forming fiberglass bowls with embedments of colorful leaves is told by Dorothy Thorne in one of THE CASTOLITER project series.



New Project Series Shows You How

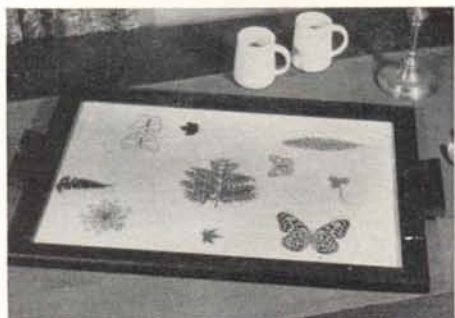
Top flight designers and craftsmen like Nancy Hutchings, Alexander Bick, Dorothy Thorne and others have written a series of project booklets especially for beginners. Step-by-step illustrated directions explain, in easy-to-follow language, how to work with liquid Castolite plastics.

This series contains 25 projects illustrated with over 150 photographs plus many sketches. Among them are the following:

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This entire series is available for One Dollar, postpaid. Please write to Commercial Crafts Division, Dept. B-9, The Castolite Co., Woodstock, Ill.

THE CASTOLITE COMPANY, Woodstock, Illinois



THE CASTOLITE CO., Commercial Crafts Div., Dept. B-9
Woodstock, Illinois

☐ Enclosed is 25c for one copy of "How to Earn Extra Money in Your Spare Time—in Your Own Home Workshop." Price twenty-five cents, postpaid.

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